

REVIEW AND APPROVAL

ALLIGATOR RIVER NATIONAL WILDLIFE REFUGE
PEA ISLAND NATIONAL WILDLIFE REFUGE

MANTEO, NORTH CAROLINA

ANNUAL NARRATIVE REPORT

Calendar Year 1994

<u>Jim C. Johnson</u>	<u>3/25/95</u>	<u>Bill A. Gabel</u>	<u>5/5/95</u>
Refuge Manager	Date	Refuge Supervisor Review	Date

<u>G. Kelly Gabel</u>	<u>5/8/95</u>
Regional Office Approval	Date

INTRODUCTION

Alligator River National Wildlife Refuge is approximately 152,000 acres in size and lies at the eastern end of a broad, flat, and swampy peninsula in northeastern North Carolina. Most of the refuge is located in the mainland portion of Dare County, with some land reaching southward into Hyde County. The refuge is part of a five-county region bounded on the north by the Albemarle Sound, on the east by Croatan and Pamlico Sounds, and on the south by Pamlico Sound and Pamlico River.

In the spring of 1984, Prulean Farms, the owner of most of what is now Alligator River NWR, withdrew its permit application for clearing forested wetlands and dissolved its organization. All property was transferred to Prudential Life Insurance Co. After more negotiation, Prudential decided to donate a total of 118,000 acres in Dare and Tyrrell Counties.

Before the donation was made, Prudential requested an "advanced ruling" from the Internal Revenue Service. Originally, the donation was to be made to TNC who planned to transfer the land to the FWS. In order to give an "advanced ruling", IRS required the donation be made to a federal agency so as to become a part of the public domain. Hence, the decision was made to make the donation directly to the FWS. The FWS accepted title to the land on March 15, 1984.

Since the decision to donate directly to the FWS was made rather abruptly, direct Service involvement did not occur until two weeks prior to the actual deed transfer. Although other management options existed, such as managing the area as a "coordination area" with the State, the decision was ultimately made to designate the area as a NWR and to move forward with appropriate funding and staffing. The 1988 acquisition of a functional farming area (approximately 5,100 acres in size) rounded out Alligator River's potential to include waterfowl management on a major level. This area is managed as moist soil units and cultivated fields (using cooperative farmers). Future management will include the restoration of some of the acreage into wooded swamp.

A portion of the original donated acreage (approximately 6,000 acres on the west side of the Alligator River) was transferred to Pocosin Lakes NWR in 1991 due to the close proximity of these lands to that refuge. At the same time, an additional 10,000 acre tract (the Dare Pocosin) was acquired in conjunction with the Pocosin Lakes property and added to Alligator River Refuge. Acquisition goals for Alligator River are to have contiguous land on the east/south sides of the Alligator River.

The vast expanse of undisturbed swamp forest and wetlands on the refuge contains many important wildlife and ecological

resources. Since much of the Pamlico peninsula has been developed by clear-cutting, peat mining, and agricultural conversion, this area remains as one of the most remote and diverse swamps in eastern North Carolina. Principal natural communities in the refuge include broad expanses of non-riverine swamp forests, pocosins, freshwater and salt marshes. Its isolation and undisturbed quality add to the value of its rich wildlife habitats. The Alligator River area is part of the northern border of the American alligator's range and remains as one of the last strongholds of the black bear in North Carolina and the mid-Atlantic coast. The refuge also provides habitat for the endangered red-cockaded woodpecker and is the site of a re-establishment program for red wolves.

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Manteo, North Carolina

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Calendar Year 1994

U. S. Department of the Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

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"NTR"

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A. HIGHLIGHTS

Red wolves doing great biologically....not so hot politically.... (See Section G.2.)

Public Use Program gains 2 trails; canoe/kayak trails gain popularity. (See Section H.1.)



At the Creef Cut Trail head, a kiosk offers refuge and Service information. 3/95 BWS

Maintenance focuses on road grading and hydrology restoration. (See Section I.3.)



Refuge Maintenance Complex includes new vehicle storage buildings (upper right) completed this year. 3/95 AB

More moist soil....DU rides again! (See Section F.2.)

Volunteer program sets another record year! (See Section E.4.)

White cedar restoration continues. (See Section D.5. and F.3.)

B. CLIMATIC CONDITIONS

Except for a few occasions, weather for 1994 was average for this area. Table 1 shows high and low temperatures and total rainfall for each month, and also lists the previous year's information for comparison. This weather information was obtained from the remote fire weather station, which worked just fine until the staff started fiddling with it! It spent a little down time at the end of the year. Although January shows a high temperature of 64.2, most of the month was exceptionally cold with wind chills to around -30 degrees on several occasions. The sounds froze, Alligator River froze halfway across, and the impoundment units were frozen over for about 2 weeks. Spring was relatively mild with limited rainfall, making for higher than normal fire danger through June. The dam broke in July and all the dust turned to mud! Hurricane Gordon approached the Outer Banks on the 18th of November, with a total rainfall of 3.13" in a 3-day period. No serious damage occurred on AR from this event.

TABLE 1
ALLIGATOR RIVER NWR WEATHER DATA

<u>MONTH</u>	<u>TEMP.</u> <u>HIGH</u> <u>1994</u>	<u>TEMP.</u> <u>HIGH</u> <u>1993</u>	<u>TEMP.</u> <u>LOW</u> <u>1994</u>	<u>TEMP.</u> <u>LOW</u> <u>1993</u>	<u>RAIN-</u> <u>FALL</u> <u>1994</u>	<u>RAIN-</u> <u>FALL</u> <u>1993</u>
January	64.2	72.5	13.1	26.4	6.71"	7.34"
February	72.3	73.2	27.3	19.4	1.68"	2.79"
March	82.2	74.8	28.9	24.6	7.38"	6.46"
April	89.1	80.2	33.4	35.6	1.43"	3.88"
May	89.2	88.3	43.2	41.5	5.47"	3.11"
June	96.6	97.2	51.3	45.7	1.45"	4.46"
July	98.2	98.6	66.4	63.1	16.07"	2.74"
August	91.8	95.9	52.9	53.4	4.94"	1.16"
September	91.6	94.6	45.9	44.4	4.57"	4.38"
October	84.4	84.4	41.5	45.5	5.48"	10.80"
November	81.3	81.0	28.4	47.8	4.88"	2.36"
December	74.5	66.7	44.0	31.8	4.90"	2.97"

C. LAND ACQUISITION

1. Fee Title

The PPP package to expand the acquisition boundary remained in Region during 1994. The refuge completed an EA for this effort in 1991. It has subsequently been caught up in a larger effort to finalize a single package for all eastern North Carolina refuges. Project Development Biologist Oberheau and later, Biologist Wendell Metzen made trips to the area during 1994 while developing proposed acquisition boundaries.

2. Easements

A 5-year easement, at \$1,000 per year, was finalized during 1993 with the owners of the 4,800 acre Durant Island authorizing the presence of wolves on their property and Service access.

An easement agreement with the owners of the 15,000 acre Mattamuskeet Farms, authorizing wolves on this area and Service access, remained in effect during the year.

A Partner's Agreement with the owners of the 10,000 acre Lux Farm property authorizing the presence of wolves and Service access for management purposes remained in effect during 1994.

Negotiations were conducted with several other large land owners (timber companies, corporate farms) during the year for easements or agreements authorizing the presence of wolves and Service access. These properties total approximately 150,000 acres and are important to the success of expanding the wolf reintroduction area west of the Alligator River.

3. Other

The Stumpy Point ball field issue remained unresolved during the year. County Commissioner interest in a possible land exchange resurfaced in 1993, with the county finally submitting a formal request for an exchange in July, 1994.

The East Lake Methodist Church land issue also remained unresolved. This issue has been at the Solicitor's office since 1990.

Revenue sharing (in lieu of taxes) became a hot issue during 1994. At the demand of Hyde County, all refuge property in eastern North Carolina was reappraised by a contractor. As expected, land values decreased resulting in lowered payments to all counties. Dare County in particular took a "hit" with annual payments dropping from \$360K+ to approximately \$175K.

Needless to say, things were kind of hot around here for a few weeks as the news media highly publicized the Service "once again running over local government". Eventually, Dare County will come out ahead in the whole deal. Pea Island land values will increase markedly, resulting in a large revenue sharing increase that will offset the loss Dare County experienced for Alligator River. Unfortunately, the reappraisal for Pea Island was not completed until months after all uproar occurred. Jerry Vits, RO Realty, and RM Johnson attended meetings with various county commissioners to "try" to help explain why their payments decreased.

D. PLANNING

2. Management Plan

Annual management planning completed and approved included the water management plan, cooperative farming agreements on 4,500 acres, and prescribed burning prescriptions on 10,138 acres.

Under the authority of an existing MOU, the refuge staff again conducted extensive surveys of select wildlife species on the Air Force Dare County Bombing Range. The Air Force provides funds for this work.

4. Compliance with Environmental and Cultural Resource Mandates

Refuge received authorization to open another borrow pit - Milltail X Navy Shell. Material from this pit will be used for road repairs and bridge replacement projects in the center of the refuge - saving 30-40 miles of travel per load of fill.

5. Research and Investigation

The cooperative agreement with the University of Tennessee to conduct black bear research on Alligator River was extended through mid-1996. The Air Force came up with \$110,000 to continue this important project - originally initiated with discretionary refuge funding (that means leaving a position vacant!). The 1994 trapping season resulted in 71 captures of 51 different animals bringing the total for the project to 173 captures of 133 different animals. Eleven females and 7 males were fitted with radio collars. Food habitats work continued by collecting and analyzing 126 scats during 1994 (897 to date for the project). Agricultural grains, herbaceous plant material, and fruits of trees, shrubs, and vines dominated by both volume and percent occurrence. In an effort to develop reliable census techniques for trend data, a total of 1756 miles of refuge roads were traveled from September 1 through December 15. Each road being utilized in this effort was

traveled weekly during this period and total number of scats present recorded. It is hoped that this survey technique will result in an index that will provide refuge staff with a means of tracking population changes after project completion. The refuge provided housing and logistical support for 3 researchers from April to November.

The NC Extension Service's sustainable agriculture and quail project, initiated in 1993, was completed during 1994. Refuge co-op farmers modified farming practices on two 500 acre units in order to test impacts of "clean" farming on quail production/survivability. Over 300 quail were captured, equipped with transmitters, and tracked throughout the 2 years of the project. The refuge again provided housing for 3 NC State researchers during 1994. As expected, there was a tremendous difference in quail productivity and survivability between "clean farmed" areas and normal refuge farming operations where extensive filter strips have been in place for several years. The final report for this effort, a MS thesis, is due by June, 1995.

The joint refuge/Air Force/NC Forest Resources reforestation of 3,000 acres of clearcuts with Atlantic white cedar continued to progress slowly. A cooperative agreement issued in 1993 to the USDA Forest Service Seedtree Lab in Starkville, MS for developing cedar seed extraction techniques remained in effect through 1994. Another agreement was issued to NC State University Forestry Dept. to examine impacts of competition on this shade intolerant species. This 5-year project is "plowing" new ground - no one can even guarantee a reliable seedling source for planting. Through the combined efforts of the Seedtree Lab, the research section of NC Forest Service, NC Forest Service Nursery, and refuge staff, the project was successful in producing 50,000 seedlings in 1994 at a cost of \$100/thousand. Timber company nurseries had been charging \$350/thousand for cuttings. All involved with the project expect that seedling production in 1995 will finalize our efforts to develop seed extraction techniques and nursery cultural requirements. The project also tested herbicide effectiveness for release of cedar seedlings and as a site prep method by aerially applying chemicals at different application rates on test plots totaling 20 acres. Plans to test various other site prep methods (mechanical, burning, and combinations of these methods) were put on hold because of refuge equipment breakdowns. Efforts also began on restoring "natural" hydrology on clearcut areas by installing water control structures in canals constructed by timber companies prior to government ownership.

Duke University continued their project on sea level rise utilizing a segment of marsh adjacent to Long Shoal River. Soil profile and vegetative transect sampling will continue annually at least through 1995.

6. Other

Numerous requests were submitted for Engineering Services during the year.

Alligator River was assigned the task of coordinating and arranging all travel for a group of Russian scientists visiting the mid-Atlantic coast region of the USA looking at natural resource management. Refuge staff devoted over 400 hours of staff time to this effort during a time when we were extremely short-handed. This assignment really irritated the staff and yes, our worst fears were realized - the coordination at the Washington office was terrible.

E. ADMINISTRATION

1. Personnel

1. Jim Johnson, Refuge Manager, GM-13, EOD 05-05-91
2. Robert Noffsinger, Refuge Manager, GS-12, EOD 04-13-87 (Transferred 6-26)
3. Steven Fowler, Forester (FMO), GS-12, EOD 06-03-91 (Transferred 6-26)
4. Michael Phillips, Wildlife Biologist (Red Wolf), GS-12, EOD 06-21-87 (Transferred 10-2)
5. Bonnie Strawser, Interpretive Spec., GS-11, EOD 12-31-80
6. Dennis Stewart, Wildlife Biologist, GS-11, EOD 3-6-94
7. Vacant, Refuge Operations Specialist, GS-9 (PI)
8. Elizabeth Parks, Refuge Operations Specialist, GS-7 (AR), EOD 1-12-94 (Converted from Student Trainee 6-12)
9. Wendy Donoghue-Stanton, Wildlife Biologist, GS-7, EOD 10-16-94
10. Angela Noffsinger, Range Tech, GS-07, EOD 05-26-85 (Resigned 5-29)
11. James Beasley, Range Tech, GS-07, EOD 05-26-85
12. Michael Morse, Wildlife Biologist (Red Wolf), GS-07, EOD 04-08-90
13. Arthur Beyer, Bio. Science Tech (Red Wolf), GS-07, EOD 12-02-90
14. Jennifer Gilbreath, Wildlife Biologist (Red Wolf), GS-07, EOD 06-30-91
15. Jonathan Windley, Range Tech (Red Wolf), GS-07, EOD 02-26-89
16. Beverly Midgett, Office Assistant, GS-06, EOD 10-06-71 (Retired 5-3)
17. Janice Lane, Office Assistant, GS-05, EOD 03-25-90
18. J. Bruce Creef, Work Supervisor, WS-07, EOD 04-21-75
19. Alan Emery, Automotive Worker, WG-08, EOD 05-22-88
20. Jonathan Powers, Eng. Equip. Opr. WG-08, EOD 04-24-88
21. Murphy Peterson, Eng. Equip. Opr., WG-08, EOD 04-22-90
22. Eric Craddock, Eng. Equip. Oper., WG-08, EOD 02-21-93

Temporary Part Time

23. Daniel Fritsch, Bio. Aid, GS-03, EOD 7-25, Term End 9-30
24. Edward Zakrajsek, Bio. Science Tech, NTE 1 year, GS-05, EOD 05-05-91 (Resigned 6-3)
25. Amy Midgett, Forestry Aid, GS-04, EOD 05-05-91
26. Bobby Govan, Eng. Equip. Opr., WG-08, EOD 10-06-91
27. Eric Meekins, Forestry Aid, GS-04, EOD 10-04-92
28. Tami Stanberry, Forestry Aid, GS-04, EOD 10-04-92 (Resigned 12-11)
29. Nolan Ambrose, Eng. Equip. Opr., WG-08, EOD 10-04-92
30. Frank Roepcke, Forestry Aid, GS-04, EOD 02-08-93
31. Hank Reynolds, Forestry Aid, GS-04, EOD 10-04-93 (Resigned 3-18)
32. Todd Owen, Forestry Aid, GS-04, EOD 10-02-94 (Resigned 12-11).



1994 Staff

1st Row (kneeling): 15, 9, 25, 5, 1
 2nd Row: 30, 17, 8, 29, 19, 18
 3rd Row: 6, 12, 21, 20, 26, 22

What a year for personnel actions! This refuge alone kept Personnel hopping! There seemed to be a mass exodus during this year.



Bye Bye Bev.....

6/94 JL

Beverly Midgett, Office Assistant, retired after 22 faithful years of service. When the early outs were offered, she qualified and left in a whirlwind on 5/3. The refuge held a retirement party for her during June. She has been missed!

Resignations included Angela Noffsinger, long time Bio Tech for Pea Island; Edward Zakrajsek, Bio. Science Tech and crew leader for fire crew; and fire crew members Tami Stanberry, Hank Reynolds, and Todd Owen.

Transfers out included Bob Noffsinger, who took the WHM Biologist position left vacant by Otto Florschutz; Steve Fowler, who moved to an Assistant Manager position at Little Pend Orielle NWR in Washington; and Mike Phillips, who transferred to head gray wolf reintroduction at Yellowstone Park.

Elizabeth Parks came back on board when she completed her degree and on 6/12 and was promoted to a GS-07 Supervisory Refuge Operations Specialist. She was promptly sent to Pea Island, where no staff had been assigned for a few months, and became queen of the turtles!

Janice Lane was promoted to GS-05 Office Assistant 10/02 after filling in for the position since the beginning of May when Beverly Midgett retired. Office Automation Clerk had not been filled at the end of 1994.

Bobby Govan, on the fire crew since 10/91, was promoted to WG-08 Engineering Equipment Operator for the fire team.

The refuge was happy to welcome Dennis Stewart, who filled the Wildlife Biologist position vacant for 2 years, and Wendy Donoghue-Stanton, Wildlife Biologist for Pea Island (who took over as turtle queen). Dan Fritsch did a great job during the summer working primarily on RCW's.

The GS-5/7/9 Refuge Manager position at Pea Island, vacant since 1991, was not filled during 1994.



When Equipment Operator Creef was reassigned to a Work Supervisor position, he immediately was found sitting in RM Johnson's chair - chain of command....

11/94 BWS

4. Volunteer Programs

Each year, the staff assumes that the volunteer program has peaked out -- both in quantity of volunteers and hours donated and in quality of contributions. During 1994, refuge volunteers demonstrated that "there's no end in sight" when it comes to limits on their assistance to these refuges. During 1994, 314 volunteers contributed 23,974 hours of service in the following areas: maintenance - 3,000; resource support - 14,300; public use - 4,594. These hours bring the 11-year end of year total of hours contributed to 139,825!! The red wolf project has continued to draw a number of college students and/or recent graduates that volunteer blocks of time. During 1994, over 4,000 hours of volunteer time were donated by 2 interns and several regular volunteers in red wolf caretaking positions and other red wolf assistance (wolf house building, etc.). Michael Kuhns returned for the summer of 1994 to assist with public use programs on Pea Island. In addition, Michael put in many long hours with both the turtle patrol and the turtle watch programs. Seven long-term volunteers/interns worked with bear/quail/Atlantic White Cedar/etc. projects throughout the year.



Sandy Ridge Trail was elevated utilizing 4'x 14' oak pallets weighing approximately 500 pounds each. The Manteo High School football team volunteered several days to assist in placement. 10/94 BWS

At the AR office in Manteo, most days were covered by a volunteer receptionist answering the phone and assisting with

assorted office duties. Some wrote letters and handled public inquiries. The volunteer program also provided volunteer assistance for Pea Island Refuge. For details on these activities see Section E.4. of the Pea Island narrative.

Again, recruitment activities for 1994 were not major, but spontaneous efforts were made whenever the opportunity presented itself. Most new volunteers continue to be recruited by current volunteers or sent over by the Dare Voluntary Action Center. Refuge volunteers continued to work through their non-profit organization, the Coastal Wildlife Refuge Society, to benefit the refuge. For details of their accomplishments during 1994, see Section H.18. of this report.

Cumulative hours tallied through September 30, 1994 yielded 50 awards:

100+ hour certificates were presented to: Linda Bowers Phillips, Rose Kurz, Al Valentine, Rae Broadaway, Heidi Michaels, Bob Webster, Richard Derr, Paul O'Bryant, Lee Yoder, Dee Derr, Gwen Skinner, Mary Ann Dubresson, Steve Grant, Mike Skinner, and Joe Folta.

Pins without rockers (250+ hours) were awarded to: Joe Folta, Mary Ann Dubresson, Linda Bowers Phillips, Lee Yoder, Rae Broadaway, Jimmy Hayes, Erica Strawser, Ed Zakrajsek, Gloria Copeland, Adele Mathers, Al Valentine, Pam Costenbader, Heidi Michaels, and Bob Webster.

Pins with 500 hour rocker were presented to: David Leake, Heidi Michaels, Dan Fritsch, Joe Folta, and Rae Broadaway.

Pins with 1000 hour rocker were awarded to: Patsy Zoll, Dab Fritsch, Marie Vansickle, Joe Folta, Heidi Michaels, Win Copeland, Bertha Burris, and Michael Kuhns.

Pins with 1500+ hours rocker were awarded to: Don Perry, Aylene Goddard, and Ritchie Buckingham.

A 2,000 hour pin was awarded to Todd Allen. Kris Kristoffersen was awarded a "Friend of the Service".

In addition to the above awards for length of service, Dave Leake was presented with a plaque for Outstanding Volunteer of 1994; his name has been added to the permanent plaque in the office.

Establishing the volunteer program for Alligator River and Pea Island Refuges required much time and effort in the beginning. Keeping the program going demands ongoing effort and money commitment; however, the refuges receive far more than they give to the volunteers. Receiving specific volunteer funds

through RO has been a lifeline for this volunteer program. Without a minimum amount of recognition and support, keeping morale high would be difficult. This financial support, as well as the moral support received is appreciated. Hats off to Richard Mattison and the Atlanta crew for remembering how much these volunteers accomplish and how little we are able to do for them! As always, a debt of gratitude is owed to these dedicated refuge volunteers. They set a fine example for all who see them. Without them, so much work would be left undone. Without them, the refuges would not be the same...

5. Funding

For FY 94, Alligator River received the following funding:

Initial Allocations (1261/1262/1113)	978.9
Challenge Grant	10.0
Watchable Wildlife	20.0
Volunteer Support	8.0
Buyout Costs	16.5
Small Maintenance Projects	115.0
Reimbursable Agreements:	
DU Moist Soil Units	31.1
NPS Prescribed Burn	4.0
Monitor Wildlife on AR	9.7
USCOE PI Beach Monitoring	90.2
Atlantic White Cedar Eco.	89.8
Study of Black Bears	136.0
Regeneration Alt. on Atlantic Eco.	472.3
Survey and Monitor Dare Co. Range	11.0
Initial Allocations (9110/9120)	68.9
Fire Seasonal Staffing	130.0
Fire Equipment Purchase	72.0
Fire NUS	10.0
Fire Equipment Maintenance	20.0
Prescribed Burning	8.0

FOUR YEAR FUNDING COMPARISON

	<u>1994</u>	<u>1993</u>	<u>1992</u>	<u>1991</u>
1261	479.7	463.2	460.1	390.7
1262	283.7	222.9	182.0	204.1
1113	385.0	240.0	220.0	200.0
1971	844.1	709.5	141.5	95.0
2821	0.0	258.2	362.1	845.8
7201	0.0	9.0		
9110	49.1	62.1	52.4	
9120	261.3	378.6	327.9	450.4

6. Safety

The safety officer for 1994 was RT "Zak" Zakrajsek. "Zak" was responsible for organizing and directing monthly safety meetings, identifying unsafe working conditions, habits, and attitudes at the refuge. Topics for monthly safety meetings included CPR training, boat safety, treatment for poison ivy, procedures for the Hurricane Contingency Plan, and snake bite treatment.

Alligator River and Pea Island Refuges ended the year with 13,000 hours worked since the last lost-time accident. EO Murph Peterson received a back injury while loading a safe in the back of a truck. RT Jim Beasley has been out of work for most of 1994 with a back injury which led to Jim having back surgery. We're all hoping Jim will be back on his feet soon. No other accidents occurred on the refuges.

7. Technical Assistance

Under a Cooperative Agreement with the U.S. Air Force, the refuge continued to provide technical assistance to the adjacent Dare County Bombing Range on wildlife management. Some of the activities included the black bear study, red-cockaded woodpecker surveys, alligator surveys, and white cedar study (see Sections F. and G.). Refuge staff also provided Air Force personnel with suggested locations for water control structure installation - the intent of this project would be to implement hydrology restoration on Air Force forestlands similar to the work being done on Alligator River Refuge.

Refuge staff provided assistance to graduate students Marc Puckett and Bill Palmer of NCSU as they continued their research projects on quail. Their work is part of the NCSU Low Impact Sustainable Agriculture project.

F. HABITAT MANAGEMENT

1. General

Five categories of natural, vegetated habitat are found on ARNWR: marsh, pocosin, mixed-hardwood pine swamp, hard-wood swamp, and white cedar swamp. These are classified as wetlands based on vegetation present, degree of soil saturation, and hydro-period. ARNWR represents one of the last remaining large tracts of pocosin-type habitat along the east coast. Although much of the refuge is relatively unaltered by humans, large portions have undergone changes in vegetation composition and hydrology caused by ditching and canal dredging for access and logging purposes. The purchase of the Prudential farmlands in March of 1988 added agricultural land to the list of habitats.

2. Wetlands

The installation of water control structures (WCS) to restore ditched areas to a more natural hydrological regime continued during 1994. These efforts were limited due to equipment and operators being detailed to Mattamuskeet National Wildlife Refuge during the time frame when weather conditions were favorable for work. This year, 4 risers were installed at 3 locations. New structures were installed at intersections of Bear and Borrow Pit Roads, Milltail and Sandy Ridge Roads, and Hook and Laurel Bay Roads.

The structures and fill allow safe movement over the canals by fire equipment and better water management for fire suppression and prescribed burning activities. The risers replace severely deteriorated wooden bridges at road intersections. Boards are placed in the risers up to ground level of the adjacent swamp/pocosin. The restoration of the ditched areas will continue with the installation of additional structures in 1995.

Table 2 presents acreage by vegetative community/land use currently under fee title ownership. See previous narratives for in-depth descriptions of the various vegetative types. An additional tract of land in Hyde County was added to the refuge. The tract is approximately 4,000 acres in size and lies east of the Barge Canal, south of Swan Creek Lake and the Alligator River, east of First Avenue and North of Fourth Avenue.

Table 2
Habitat Types
ARNWR, 1994

Habitat Type	%	Approximate Acreage		
		Dare	Hyde	Total
White Cedar Swamp	5.7	6,900	1,568	8,468
Hardwood Swamp	8.3	11,600	636	12,236
Mixed Hardwood				
-Pine Swamp	7.6	6,108	5,272	11,380
Cypress Hardwood	.9	1,300	--	1,300
Shrub Pocosin	12.2	17,810	612	18,422
Cane Pocosin	1.6	2,300	--	2,300
Tree Pocosin	19.7	33,072	5,512	38,584
Mixed Pine	19.2	28,100	--	28,100
Flood Killed	10.5	15,300	--	15,300
Lakes/Open Water	.7	754	398	1,152
Marsh	6.8	9,904	--	9,904
Farmland and				
Moist Soil	6.8	5,100	--	5,100
Totals	100	138,248	13,998	152,262



Refuge now has about 2,000 acres of moist soil units that provide badly needed wintering habitat for swans (pictured here), ducks, and geese. 12/94 AB



Twiford South Impoundment Unit receiving the type of use intended by the staff. 12/94 JCJ

This year 1,800 acres of moist soil was produced in restored, prior converted farmland on the farm unit. Approximately 1,200 acres of this was burned in the spring and 250 acres was disced. Portions of the 1200 acres burned were also disced. This is the third year fire has been used in the moist soil units and results continue to be very promising. Approximately 350 acres scheduled to be burned, disced, or both did not receive any treatment for various reasons. These units are dominated by broomsedge, soft rush, woolgrass, and other undesirable species. Overall the production of desirable plants (wild millet, smartweed, fall panicum, switchgrass, foxtail, etc.) in the moist soil units was greatly improved over the previous 3 years. Units in need of burning/discing that received no treatment during 1994 will have top priority in 1995.

3. Forests

The Atlantic white cedar (AWC) regeneration project which is being funded by the DoD Legacy Resource Management Program is progressing more or less on schedule. Partners in this project are the Department of Defense, as represented by the Dare Bombing Range Forester, the North Carolina Division of Forest Resources, Research Section (NCDFR), and the USFWS.

Locally, approximately 45 acres have been replanted with AWC seedlings, including 5 acres as a genetic study plot. Again, staff members had the pleasure of collecting white cedar cones. Seeds will be separated, cleaned, and some will be planted in NCDFR seed beds this spring. The seedlings derived from this crop will be planted here in the spring of '96.

A related issue is the contract work being done at the Southern Forest Experiment Station in Starkville, Mississippi. This work entails the development of seed extraction and cleaning techniques for AWC as well as germination tests. Hopefully, this work will result in greater availability of AWC seedlings. This has been a major roadblock in the resurgence of this valuable tree. Expected outcomes are to be able to determine seed viability from young trees as well as seeds that have been buried in the organic soils for years.

The contract for services to inventory old AWC cutover areas was canceled because bids from firms with acceptable proposals greatly exceeded estimated costs and amounts budgeted. The plan was to determine current plant communities and associations on these sites and establish permanent plots on the Refuge and USAF Bombing Range for the purpose of monitoring competition, composition, mortality and growth. This is baseline information required prior to making decisions regarding forest development and management activities to be conducted on each area. A Global Positioning System (GPS)

base station and rover units have been acquired as a result of this need. The project will be completed by hiring summer employees and using staff during the summer of 1995.

4. Croplands

The acquisition of the 10,000 acre Prudential Farms inholding in March, 1988 gave the refuge even greater diversity of habitats and a great potential for managed habitat for water-fowl, shore-birds, and wading birds. The tract included 5,100 acres of cropland. Prudential had developed the area from forested wetlands by encircling it with dikes and constructing drainage ditches. The area is drained by 5 pumps located at 2 pump stations. Each pump removes 250,000 gallons of water per minute from the farm fields. Pumping is required to keep the area dry enough to farm. The reconversion of the area to wetland habitat is basically simple - don't pump the areas where plans call for permanent water or reduce pumping on moist soil areas. This action is accomplished by judicious placement of flashboard risers in conjunction with existing dikes and building relatively small, permanent cross dikes. To date, about 1,800 acres have been converted to permanent water and moist soil units. Ducks Unlimited committed to a 50:50 cost share to restore another 400 acres in 1994. Total project cost is \$62,000. Survey work for these dikes began in April and construction was expected in late summer or early fall. However, the Notice to Proceed was not issued until November and construction had to be postponed until January, 1995.

Because of pending new dike construction, flooding approximately 400 acres in the North Twiford C-1 Moist Soil Management Units had to be postponed. Gradual flooding began in December and approximately 300 acres were partially flooded by month's end. Moist soil management units in Creef A-1 (160 acres) and Creef A-2 (108 acres) were not flooded in 1994 due to the dike construction project.

Refuge cooperative farmers had a relatively poor year in 1994 after a good 1993 crop. Spring rains and an extended dry period after planting, followed by heavy rains in July resulted in low production. The refuge portion of the crop produced for 1994 was 12 bushels of corn per acre farmed. In 1993 the refuge received 10 bushels of corn per acre. Since a good corn yield on this land is 100 bushels/acre this is believed to be a reasonable rate. In 1995-1997, agreements call for the refuge to receive 13.5 bushels of corn/acre. Crops were planted on 3,100 acres in 1994, primarily soybeans and wheat. Other crops included lespedeza, milo, some barley and oats, and some organic soybeans. Farmers disced approximately 200 acres in refuge moist soil units.

9. Fire Management

Fire Management during the past year began with a number of planned prescribed burns. Unfortunately, as is often the case here, burn conditions fluctuated from being too wet to being too dry, winds that were too high and from the wrong direction, and no winds, often within a period of 3 days to a week. An additional setback to the fire program occurred when Steve Fowler announced that he was leaving for a job at Little Pend Orielle National Wildlife Refuge in Washington.

As a result, the burning was strung out longer than preferred and some areas scheduled for burning did not get burned. Approximately 1,200 acres of impoundments, old fields, and dikes were burned from late March to June. Plans to implement prescribed burns in forested habitat did not materialize because of the FMO's departure and because of equipment breakdowns.

The spring wildfire season was fairly quiet with adequate moisture. By early summer fuels were beginning to dry out rapidly. Adequate moisture in mid-summer reduced the potential for wildfires. Late summer and early fall saw a few days with a high fire hazard. Two wildfires occurred. Approximately 60 acres of mostly marsh burned during the Mashoes Road Fire on the north end of the refuge. Approximately 0.5 acre of mixed white cedar/cypress/tupelo/bay forest burned on the south end of the refuge during the Mattamuskeet Farms Fire. Both fires resulted from lightning strikes.



Pocosin Lakes staff (Chris Farinetti) and Bombadier assisting in burning an impoundment unit. 12/94 DS

During the year, fire personnel from Alligator River were dispatched to the Fish Day Fire on the Croatan National Forest. One member of the fire crew was dispatched to assist with fire suppression activities at the Corral Complex Fire, Edgar Fire, and Idaho City Complex Fire in Idaho.

As is typical, much of the season was spent in preparation for wildfire and prescribed burn activities. Personnel from this station were sent to various locations for training assignments. Classes attended included S-211, S-130, S-190, S-205, S-230, S-336, S-390, I-363 and I-365. In addition, courses entitled Urban/Wildland Fire Interface and Tractor Plow for Equipment Operators were attended.

In addition to the acres mentioned above, prescriptions to burn about 1,500 acres of pocosins were written and approved in 1993. Included in the pocosin tracts were prescriptions specifically designed to improve and maintain RCW habitat. Although much time and effort went into preparing the pocosin tracts and improving the firelines etc...; they were not burned due to equipment breakdowns, limited windows for a prescription fire, and the vacant FMO position.

G. WILDLIFE

2. Endangered and/or Threatened Species

Five endangered species have been documented on the refuge. Management programs are in place for the red wolf and red-cockaded woodpecker. An inventory program is in place for the American alligator. There are no plans to manage specifically for or inventory bald eagles or peregrine falcons.

a. Federally Listed Endangered and Threatened Species

American alligator (Threatened): American alligators reach the northern extent of their range on the refuge and probably were never very numerous in the area. A few have been seen each year in the marshes, ponds, streams, and canals. The U.S. Air Force contracted with the refuge to survey the Dare County Bombing Range for alligators in 1988, 1990, 1991, 1992, 1993, and again in 1994. The highest density alligator population is consistently found on Whipping Creek Lake. However, 1994 results showed a higher density for Lost Lake. These results are based upon 1 survey at each location during 1994, whereas previous years have had 2 surveys at each site. Data do suggest that the highest density populations occur in the vicinity of Whipping Creek Lake and Lost Lake. Information on number of alligators observed per mile for all routes on the refuge and bombing range for 1994 and for all survey years is given in Table 3.

During 1991, the staff was very pleased to finally document successful 'gator nesting and was able to mark young alligators on Whipping Creek and Lost Lake by notching tail scutes. Young from both locations were recaptured during 1992 and young from Whipping Creek were recaptured in 1993. Regrettably, staff shortages and work loads did not permit nest searches and capturing young alligators in 1994.

TABLE 3
NUMBER OF ALLIGATORS OBSERVED PER MILE FOR ALL ROUTES
(1988-1994)

<u>Survey Route</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>
Whipping Creek	1.6		.6	1.0	1.00	1.4	1.2
Air Force Target Area	.07		-0-**	.14	-0-	-0-	.14
Navy Target Area	.07		.12	.12	-0-	-0-	-0-
Lake Worth	-0-						
Milltail Creek	.39	.13	.13	.13	.26	.26	.40
South Lake				-0-	.19	-0-	-0-
Swan Creek				.18	.55	.36	.18
Sawyer Lake			-0-	-0-	-0-	.45	-0-
Laurel Bay Lake				-0-	-0-	-0-	-0-
Lost Lake				.88	3.5	.87	1.3
Callaghan Creek					-0-	.33	-0-

** This is not to say that there are no alligators present, only that none were observed on the survey.

Nest searches and mark-recapture searches for young will continue to improve knowledge of growth rates, survival rates, and movements. It is hoped that staffing and funding will not prevent this important endeavor during 1995. Marking additional alligators next year and recapturing those marked in previous years will improve data and may provide some insight as to the effects of winter on growth and survival of young alligators at the northern limit of the species' range.

Red-cockaded woodpecker (Endangered): The red-cockaded woodpecker survey, funded through the DoD Legacy Program, continued in 1994. Due to staff shortages and insufficient funding for flight time, this year's survey focused on evaluating status of known colonies and cavity trees. Additional habitat was surveyed from roadways and by cutting trails through the dense pocosin vegetation. The 1993 survey clearly established benefits resulting from use of helicopters to survey remote, relatively impenetrable areas. Techniques used in the 1993 survey were reported in the 1993 Annual Narrative.



Work on RCW colonies continued during 1994 - howbeit at a slow pace due to lack of funds and staff. DF



Excluder device installed in an RCW cavity - those installed in 1994 worked well in keeping other birds from capturing the cavity. EZ

All known cavity trees (recently located and known from past surveys) were observed and monitored for recent activity to determine status (Table 4). Eight of 9 known clusters had active cavity trees as determined by active starts or active cavities. One cavity restrictor was installed in 1993 and 7 were installed this year because of cavity enlargement problems. None of the cavities with restrictors showed signs of enlargement. Eight clusters that we have spotted from the air remain to be visited by ground. Coordinates were established for at least 1 reference tree at each surveyed cluster with a Global Positioning System.

Once the colonies are located, the understory/midstory vegetation must be controlled. Currently the understory beneath all the colonies is too thick to even walk through, and the midstory is too thick to see through. Also the midstory is at or near cavity level in all of the active colonies. Historically, this is known to cause cavity abandonment. It is conceivable that limited mechanical removal of midstory and understory vegetation may serve to attract other woodpecker species, thereby partially explaining problems we are experiencing with cavity enlargement.

Prescribed fire was planned for the Whipping Creek colony and other areas on ARNWR to control this hardwood understory/midstory encroachment. This prescription, however, has not yet been carried out. Again, this will be a priority for next year.

Bald eagle (Endangered): Refuge staff sighted a mature bald eagle flying over the west side of the refuge in June. An eagle nest was discovered on the west side of the Alligator River but not on federal lands. Because of the remoteness of the nest, it was not possible to determine if it was productive.

Peregrine falcon (Endangered): Peregrine falcons are known to move through the refuge during migration. No reports of peregrine falcons occurred during 1994.

TABLE 4
RED-COCKADED WOODPECKER STATUS ON ARNWR AND
DARE COUNTY BOMBING RANGE - 1994

<u>CLUSTER NAME</u>	<u>YEAR LOCA.</u>	<u># OF CAVIT TREES</u>	<u># ACT. CAVIT TREES</u>	<u>FORAG- ING RCW'S SEEN</u>	<u>YOUNG DOCU- MENTED</u>	<u>ADD'L TREES LOC. IN '94</u>
<u>ARNWR</u>						
Whipping Creek West	1992	3	2	X	X	X
Whipping Creek East	1993	1	1			X
Chip Road	1989	3	0			
<u>DCBR</u>						
North Faircloth	1989	6	3	X		X
South Faircloth	1989	7	2	X		X
West Jackson	1989	1	0			
East Jackson	1989	2	0			
Bear Collar	1993	5	3	X		X
Bluewing Road	1994	1	1	X		X

Red wolf (Endangered): During 1994, staff released 8 wolves west of Alligator River (Pocosin Lakes NWR): [(4 adult pairs) 375M/379F released 1/5/94; 465M/448F released 2/2/94; 374M/437F released 2/3/94 and 497M/383F released 4/14/94]. All adults released were captive born except 497M (wild born 1991). Of the 8 wolves released, only 1 (379F) is currently free-ranging; 3 were pulled for management reasons (374M, 437F, 448F), 2 were killed by automobile strikes (465M, 383F) and 2 were shot (375M, 497M). More releases are planned for Pocosin Lakes NWR during 1995.

During 1994 at least 26 pups were produced from a minimum of 8 litters. These births were offset by the death of 21 wolves.

TABLE 5
RED WOLF MORTALITY DURING 1994

Wolf	Date of Death	# Mos in Wild	Cause of Death
377F	01/02/94	0.5	killed in collision with vehicle
465M	02/15/94	0.5	killed in collision with vehicle
319M	04/01/94	54.0	old age (300F's mate)
372M	04/03/94	20.0	drowned during processing
383F	05/29/94	1.5	killed in collision with vehicle
693M	~05/29/94	1.25	6 wk-old pup(383F) presumed dead
694M	~05/29/94	1.25	6 wk-old pup(383F) presumed dead
695M	~05/29/94	1.25	6 wk-old pup(383F) presumed dead
696F	~05/29/94	1.25	6 wk-old pup(383F) presumed dead
697F	~05/29/94	1.25	6 wk-old pup(383F) presumed dead
588F	06/17/94	10.5	unknown-possible starvation
589F	06/22/94	10.5	unknown-possible starvation
586M	08/07/94	12.0	unknown-possible starvation
300F	08/12/94	60.0	old age (319M's mate)
751M	08/18/94	4.0	killed in collision with vehicle
408F	08/26/94	12.0	unknown-possible starvation
757F	10/07/94	6.0	pesticide poisoning
358M	10/12/94	10.5	poor health-mange
375M	11/09/94	10.0	gunshot
664M	12/15/94	19.5	unknown
497M	12/31/94	39.0	gunshot

As a result of releases, births, deaths and some management actions, the free-ranging red wolf population fluctuated on nearly a monthly basis.

TABLE 6
MONTHLY RED WOLF POPULATION (FREE-RANGING)

Month	Population	Month	Population
January	44	July	40
February	48	August	44
March	47	September	39
April	52	October	44
May	52	November	41
June	46	December	42

As of 31 December the population included a minimum of 42 wolves that had been in the wild for an average of 26.5 months.

TABLE 7
FREE-RANGING RED WOLVES IN EASTERN NORTH CAROLINA
AS OF 31 DECEMBER 1994

Wolf# & sex	Birth location	Age ^a (mos)	# Mos. in wild (mos) ^b	Location of home range		Comments
331M	captivity	79.2	66.7	federal	land	consorting with 394F
344F	wild	79.7	79.7	private	land	consorting with 392M
379F	captivity	67.5	11.8	private	land	consorting with 674M
382F	captivity	66.4	28.9	private	land	lone female
392M	captivity	67.1	59.5	private	land	consorting with 344F
394F	captivity	67.1	58.8	federal	land	consorting with 331M
442M	wild	55.8	54.6	private	land	consorting with 505F
443F	wild	55.8	53.7	private	land	consorting with 583M
444F	wild	55.8	53.2	federal	land	consorting with 507M
496F	wild	44.5	40.6	private	land	probably consorting with unknown male
500F	wild	44.0	43.0	private	land	consorting with 519M
503F	wild	44.0	43.0	private	land	consorting with 670M
505F	wild	44.1	44.1	private	land	consorting with 442M
506M	wild	44.1	44.1	private	land	lone wolf
507M	wild	44.1	44.1	federal	land	consorting with 444F
508F	wild	44.1	42.5	private	land	lone female
519M	captivity	31.5	28.9	private	land	consorting with 500F
583M	wild	32.1	32.1	private	land	consorting with 443F
661M	wild	20.5	20.5	federal	land	pack member
662M	wild	20.5	20.5	federal	land	pack member
663M	wild	20.5	20.5	federal	land	pack member
665F	wild	8.0	8.0	private	land	pack member
666M	wild	8.0	8.0	private	land	pack member
670M	wild	20.0	20.0	private	land	consorting with 503F
671M	wild	20.0	20.0	private	land	consorting with 673F
673F	wild	20.0	20.0	private	land	consorting with 671M ^c
674M	wild	20.0	19.5	private	land	consorting with 379F
698F	wild	8.6	8.6	private	land	pack member
745M	wild	8.8	8.8	federal	land	pack member
746M	wild	8.8	8.8	federal	land	pack member
747F	wild	8.8	8.8	federal	land	pack member
752M	wild	8.0	8.0	federal	land	pack member
754M	wild	8.0	8.0	federal	land	pack member
755M	wild	8.0	8.0	private	land	pack member
756F	wild	8.0	8.0	private	land	pack member
759M	wild	8.5	8.5	private	land	pack member

Wolf# & sex	Birth location	Age ^a (mos)	# Mos. in wild (mos) ^b	Location of home range	Comments
760F	wild	8.5	8.5	private land	pack member
761F	wild	8.5	8.5	private land	pack member
763F	wild	8.1	8.1	private land	pack member
764F	wild	8.1	8.1	private land	pack member
766M	wild	8.6	8.6	private land	pack member
768M	wild	8.6	8.6	private land	pack member

^a - Age was calculated relative to 31 December 1993.

^b - Number of months in the wild did not necessarily span the period from the date of release for animals born in captivity or from birth for animals born in the wild, as some wolves were placed in captivity for varying periods of time and subsequently re-released.

^c - 673F's presence was known from capture on 01/14/93.

During February 1995, staff expects about 7 red wolf pairs to breed in the wild. These breedings should result in the production of 21 to 25 pups that mature to an age of self-sufficiency. Thus, by December 1996, the red wolf population should include 65 to 75 animals, of which about 80% will have been born in the wild.

During 1994, 17 to 27 captive wolves were maintained at the Alligator River breeding facility at any given time. As of December 31, 22 wolves resided at the facility.

Captive breeding at the refuge has become an increasingly important component of the restoration effort. Since 1986, 116 wolves have been maintained at the facility's 15 pens for a varying periods of time. Additionally, 30 captive adult pairs have been maintained through breeding seasons. Eleven of these pairs bred successfully and produced 47 pups.

3. Waterfowl

Historically, large numbers of waterfowl have not utilized ARNWR, but the refuge does support a substantial year-round population of wood ducks utilizing the numerous ditches, canals, creeks, lakes, natural openings, and swamps. Diving species such as scaup, canvasback, redhead, bufflehead, and mergansers can be found on the Alligator River and the associated sounds. Addition of the 5,100 acres of farmland in 1988 substantially increased opportunities for waterfowl management. This management has been achieved primarily by converting farm fields, classified as prior converted wetlands, to moist soil management units.

It appears that waterfowl use remained relatively stable for some species during the 1993-1994 survey period while several species seem to have decreased. Peak numbers during 1993-1994 were 590 mallards, 230 blacks, 4432 pintails, 3890 green-winged teal, and 4040 ring-necked ducks. This compares to 1432 mallards, 5109 pintails, 6770 green wing teals, and 3221 ring-neck ducks during the 1992-1993 season. Results of this year's surveys are given in Table 8.

Table 8
Waterfowl Survey, ARNWR Fall 1993 - Spring 1994

Waterfowl Type	Nov *	Dec 13	Dec 22	Dec 30	Jan 6	Jan 14	Jan 20	Jan 26	Feb 8	Feb 18	Mar *
Mallard		175	124	141	590	343	552	458	306	86	
Black duck		10	38	2	230	32	111	131	0	14	
Pintail		1793	1340	1795	3335	3540	800	4432	2680	855	
Widgeon		8	0	8	80	120	200	328	560	525	
Gr.winged teal		805	240	3000	2240	2400	3540	3490	3890	2450	
Wood duck		37	150	8	180	118	709	290	8	15	
Ring-necked duck		175	800	1790	3470	0	2000	3814	4040	1588	
Gadwall		0	0	0	0	0	0	0	0	0	
BW Teal		2	0	0	0	0	0	0	12	12	
Shoveler		0	0	0	0	0	40	46	20	16	
Coot		0	0	0	100	30	20	80	4	20	
Canada Goose		0	0	0	0	10	0	0	0	0	
Tundra Swan		21	270	260	448	27	0	248	110	2	
Unknown		385	625	0	0	40	603	550	0	60	
TOTALS		3411	3590	7004	10673	6660	8575	13867	11630	5643	

* No survey data

8. Game Mammals

During 1994, the refuge continued the cooperative black bear research study with the University of Tennessee (UT). The Air Force (Dare County Bombing Range) continued as a partner in

the effort and transferred funds to help continue and expand the project. Information such as sex and age distribution, age at primiparity, birth rate, survival, and density of the bear population will continue to be gathered. Although quarterly progress reports have been received, the annual progress report has not been received at this time. (See Section D.5.)



One of many bears trapped this year as the effort to develop population estimates continues. 4/94 JCJ

H. PUBLIC USE

1. General

In the Public Use Program of Alligator River, 1994 has taught patience. Major public use projects (Creef Cut and Sandy Ridge Trails) begun and "almost completed" during 1993 remained in limbo during most of 1994. At year's end, though both projects were very near completion, NCDOT portions remained incomplete. (See Section H.4 for details). The good news is that there is an end in sight! Stay tuned for next year's report!

The public use program remains primarily consumptive in nature, with the hunting program being most active. Public use trends are moving upward in the non-consumptive areas; however, we do not anticipate ever having a large non-

consumptive program on this refuge. The Milltail Creek Canoe/Kayak Trail System has been very popular. It is anticipated that an increase of school group and family use once the trails are completed and "announced" will occur.

Total visits to the refuge in 1994 were estimated to be 14,512.

Administrative offices for the refuge remained in the GSA leased office space in Manteo. A few visitors continue to locate the office, but most information was disseminated by telephone, correspondence, and through the news media. During 1994, the refuge continued to focus on providing a greater number of media contacts while keeping the messages short and simple. A total of 11 news releases and 6 radio/TV spots were done.

2. Outdoor Classrooms - Students

Many teachers have established regular patterns in their utilization of the marshes of Pea Island for independent use with their classes. More recently, classes have begun to show an interest in visiting Alligator River NWR. More independent use by classes is anticipated once the trails and interpretive materials are in place. Occasional requests were received for staff/volunteer lead programs on the refuge. At this point, most of these requests are related to the Red Wolf Program. Trained volunteers continue to be available to conduct wild-life programs in area classrooms. Programs on the Red Wolf, Birds, Mammals, Amphibians, Reptiles, Fish and Animals without Back-bones, and Bird Banding and Migrations are available. During 1994, these educational programs were presented to 1,175 students.

To encourage educational endeavors in the community, refuge staff served as judges for both the First Flight Middle School and Cape Hatteras High School Science Fairs and assisted, on request, with special projects.

3. Outdoor Classrooms - Teachers

There were no local requests for teacher training workshops in 1994. Since Alligator River and Pea Island Refuges are located in an area rich in conservation education/ interpretation agencies, these refuges do not receive the requests common on other stations that are often the sole sources available. The North Carolina Aquarium, Jockey's Ridge State Park, Nags Head Woods Ecological Preserve, and Cape Hatteras National Seashore offer environmental education and teacher training activities. Teachers here are hounded constantly to attend such functions. For this reason, the refuge has chosen to focus more on other educational needs rather than attempt

to compete with other conservation agencies. The refuge took the lead in coordination of a joint leaflet to provide teacher assistance in planning field trips (see informational packet).

4. Interpretive Foot Trails



Creef Cut Wildlife Trail is fully handicapped accessible.

3/95 AB

Two trails, begun in 1992, remained in limbo during 1994. Appreciable progress was made on Creef Cut Wildlife Trail and Fishing Area. Interpretive panels for the trail and kiosk and sandblasted trailhead signs arrived from Wilderness Graphics mid-year. The kiosk was constructed by local contractor Paul Creef (the same contractor who built the Pea Island Visitor Center); the contract was awarded and paid by the Coastal Wildlife Refuge Society. NCDOT paved the parking area in September and the landscaping completed in late November. Due to a miscommunication between the NCDOT and the contractor for paving, the parking area was constructed much closer to the highway than was intended. Planting plans in that area had to be changed to low-growing evergreens, so as to avoid causing a traffic hazard. At year's end, the only remaining action on this project was the installation of bollards, parking area signs, and curbs - all by the NCDOT. It is hoped that the refuge will have the "ribbon-cutting" for this project by Spring of 1995. Donors to the projects have waited patiently for their invitations to the grand opening!



From the dock, the paved trail extends a half-mile
east.....

10/94 JCJ



....to a 150 foot boardwalk over a beautiful fresh
water wetland.

10/94 BWS



A handicap accessible fishing dock provides fishing access year round. 10/94 BWS

Sandy Ridge Trail is complete, except for the installation of the sandblasted trailhead signs and the interpretive trail signs. The Milltail Creek Canoe/Kayak Trails are also complete. In addition, a short trail leading from the parking area to an overlook viewing Milltail Creek is complete. Unfortunately, the NCDOT has not completed the enlargement and marling of the parking area. Until this work is complete, the trailhead signs cannot be installed. Again, official completion is hoped for by spring. The Milltail Creek Canoe/Kayak Trail System has been quite popular this year. On most days, there are several folks using the trail. If there were a local place to rent canoes or kayaks, use would increase dramatically; however, there is not a demand great enough to consider a concession for this purpose.

During 1994, approximately 2,541 people utilized the Alligator River trails. Of these, fewer than 270 used the walking trails. It is anticipated that 1995 will see a tremendous increase in this use.

6. Interpretive Exhibits/Demonstrations

Refuge employees staffed displays and exhibits at the some of the usual annual events around Dare County and eastern North Carolina. Unfortunately, due to staff shortages, many requests were denied for this type of activity. Educational programs for the refuge during 1994 are shown in Table 9.

TABLE 9
ALLIGATOR RIVER
PUBLIC USE PROGRAMS

<u>Program Type</u>	<u>On/Off Refuge</u>	<u>#Programs</u>	<u>Total #Part</u>
General for Adult Groups	Off	2	120
General for Public	On	5	160
General for Public	Off	7	495
School or School Related Gr	On	10	246
School Groups	Off	4	570
Einglehard Seafood Festival	Off	1	1,000
Dixie Deer Classic	Off	1	10,000
Scuppernong River Festival	Off	1	500

*All off-refuge programs for complex; plus AR on-refuge programs.

7. Other Interpretive Programs

Red wolf howlings have proven to be popular programs on the refuge. Three public howlings were advertized and conducted during 1994 (Earth Day, Halloween, and Christmas). In addition, refuge staff made an extra effort to provide howlings for community groups who requested them and involved other refuge staff, volunteers, and families in the programs, as well.

A number of off-refuge programs were conducted during 1994 by staff and volunteers. Many dealt with the red wolf program; others addressed specific and general refuge related topics. These programs and other related off-refuge programs are also shown in Table 9.

8. Hunting

With approval of the master plan shortly after establishment, the refuge was divided into 3 basic public use areas, with several additional safety or management zones closed to all hunting. As new areas have been acquired, they have been added to 1 of the 3 existing categories, or (in the case of the farm fields) put into a newly created category. The farmfields were designated as open to all authorized uses during September and October (except waterfowl hunting), but closed to public entry during all other times. With additions and deletions of land in the refuge, the ratio of land designated for hunting with chase dogs and land designated as closed to use of chase dogs has remained relatively constant (1:1). The 5-year review of the master plan took place during 1993. Some changes in the hunting area designations resulted; however, the ratios remained approximately the same. Public reaction to the changes were favorable.

For the third season, refuge hunting permits were required for all hunts. The permit system has also been accepted readily by hunters. Again this year, the hunt leaflet contained the permit; signing the permit acknowledged having read and understood the leaflet.

White-tailed deer continued to be the most sought after game species on refuge lands. Since Alligator River contains over 150,000 acres of habitat traversed by more than 150 miles of logging roads, and because many of these roads share junctions with State roads, it is difficult to establish effective hunter check stations. The NCWRC again required hunters to register hunter-killed deer with a local wildlife cooperator agent; however, they assume that an estimated 40% go unreported. In past years, the figures reported by the State have been utilized and extrapolated to provide more realistic estimates. The best estimate indicates approximately 280 deer were harvested on the refuge during the 1994-95 season.

This year was Dare County's fourth annual bear season since the NCWRC and County Commissioners reinstated a bear season. The 5-day bear season ran November 14-19; 1 bear was documented as taken in Dare County during 1994.

Most of the brochure boxes labeled with signs stating "Hunter Information" survived the winter and needed just a bit of sprucing up and stuffing. The new hunt leaflets arrived on time and were clear and correct. Again this year, extra effort was made throughout the seasons to ensure that leaflets were always available, since the brochure contained the required hunting permit. The effort was minimal, since routine patrols took refuge officers by the boxes frequently.

September 12, bow season began along with the usual weekend patrol assignments for refuge officers. Muzzle loader season came in on October 10, and regular gun season started on October 17. As always, on November 1 the farm field gates were closed and locked. For the rest of the year (and through September, 1995), this area was closed to all public entry.

Waterfowl seasons were October 6-8, November 23-26, and December 19 - January 20. A limited amount of waterfowl hunting took place on the refuge, but most occurred over open water in the sounds and in Milltail Creek. The farm fields were open to public use during October; however, the area was closed to waterfowl hunting.

Though the new regional hunting policy for youths has been difficult to enforce, the fact that Dare County Schools already had the State Hunter Safety Course as a part of the seventh and eighth grade curriculum certainly helped. Since 1991, North Carolina has required all first-time hunters to

successfully complete the Hunter Safety Course. In addition to the courses offered in the public schools, NCWRC Officer Brinkley and his associates conducted several extra classes to enable other youth/adults in the area to qualify to hunt on the refuge. The refuge staff has yet to hear of a person who has needed the course and was unable to find a class.

Estimated public hunting activity appears below:

<u>Activity</u>	<u>Visits</u>
Duck	261
Big Game	3,781
Upland Game	445

There are very few places to quail or rabbit hunt on the refuge. Small game hunting is primarily for raccoon, squirrel, and rabbit.

9. Fishing

The heaviest recreational fishing effort in the vicinity on the refuge is in the surrounding sound system from October through April. Fishing pressure on the refuge is relatively low and is a reflection of the isolation of the area and limited access rather than of low catch per unit effort. Angling for bluegill, crappie, chain pickerel, channel catfish, flier, largemouth bass, and yellow and white perch is considered good. During 1994, there were an estimated 1,594 fishing visits to the refuge. The construction of the handi-capped accessible fishing dock at Creef Cut is expected to increase fishing numbers eventually.

10. Trapping

Furbearer trapping was allowed under North Carolina regulations. Since trapping is considered a commercial use of the refuge, neither visits nor activity hours are normally recorded under public use. For the 1994 trapping season, no special use permits were issued for refuge trapping.

11. Wildlife Observation

Canoeists enjoyed paddling on Milltail and Whipping Creeks and observing an occasional alligator, wood duck brood, or other wildlife in the area. The Milltail Creek Canoe/Kayak Trail has encouraged folks to come to the refuge for wildlife observation.

Wildlife photographers utilized the refuge to some extent for a chance at bear, deer, or any number of birds and other animals. General habitat scenes were popular for an adventuresome few. The following figures represent wildlife/wildlands observation during 1994:

<u>Activity</u>	<u>Visits</u>
Foot	2,542
Vehicle	5,651
Boat	2,910
Photography	197

17. Law Enforcement

Refuge collateral duty officer numbers were down to 3 for the 1994-95 hunting season. Because of staff shortages, in general, the 3 officers were already under heavy work loads before the hunting season began. This situation made the Alligator River season a long one!

Officers Johnson, Strawser, and Windley attended the annual LE Refresher in Tallahassee and requalified midyear.

The following NOV's were written by Refuge Officers:

<u>Violation</u>	<u>Number</u>
No Federal Duck Stamp	2
No Refuge Permit	3
Transporting Loaded Firearm	5

In addition, NCWRC Officers wrote the following State citations for violations occurring on the Refuge. Several of these cases were made by refuge and state officers working together in joint operations and prosecution made through state court.

<u>Violation</u>	<u>Number</u>
Take Deer w/Aid of Motor Vehicle	3
Use of Artificial Light to Take Deer	5
Hunting Deer Without Hunter Orange	1
Failure to Report Big Game Kill	1
Fishing Without Valid License	1

18. Cooperating Associations

The Coastal Wildlife Refuge Society accomplished much work in 1994, promising an even brighter 1995 for education, interpretation, recreation, and information on Alligator River and Pea Island National Wildlife Refuges. Membership in the Coastal Wildlife Refuge Society reached 342. For financial information, see Table 10.

CWRS's major project was the construction and staffing of the new Visitor Center for Pea Island. Through a \$15,000 loan from the National Fish and Wildlife Foundation (NFWF), plans to build the Visitor Center were put into motion. CWRS spent over \$30,000 on this project, which included the construction of a Y-shaped observation platform overlooking New Field on

North Pond Trail. CWRS funds covered the 2 construction contracts and miscellaneous supplies and materials needed. USFWS Challenge and Watchable Wildlife Grants (totaling \$30,000) were spent to purchase the building materials for both projects.

Also during 1994, Creef Cut Trail came closer to completion. CWRS contracted Paul Creef (same contractor as for the VC) to build the kiosk for Creef Cut. The NCDOT began the paving of the parking area in late September and let the contract for landscaping. It is hoped that the end is truly in sight for the Creef Cut Project. The interpretive panels arrived in December. The Milltail Canoe/Kayak Trails and Sandy Ridge Wildlife Trail also received a good amount of attention and effort during 1994. By year's end, this system of trails was 85% complete. NCDOT upgrade of the parking area is still forthcoming. The canoe/kayak trails have received an amazing amount of use during the year.

During 1994, CWRS handled funds from the NFWF (a \$10,000 grant) and sponsored the construction of a cabin for volunteer housing at the red wolf captive colony. Though it has no water or electricity, the cabin is a mansion compared to prior living arrangements! As in the past, one of the major functions of the CWRS was to assist the refuge with incidental supplies and materials needed to keep the interpretation and recreation programs going. Small purchases ranging from lawn mower repairs to a stipend for the summer intern totaled slightly more than \$2,000. As would be expected, the sales unit has grown quite a bit during 1994. At year's end, sales items included approximately 75 book titles, 10 designs of shirts (including T's, long-sleeved T's, and sweats), and 35 miscellaneous items ranging from "playfolds" and mobiles to cassette tapes and children's binoculars. The sales unit has been a learning experience for all involved. The VC opened officially on July 26. In it's first 3 weeks of operation, gross sales from the Book/Gift Shop exceeded \$3,700. At the end of the fiscal year, the much needed directional signs and interpretive exhibits were still not installed.

TABLE 10
1994 FINANCIAL REPORT
COASTAL WILDLIFE REFUGE SOCIETY

Income

Donations		
Creef Cut	5,450.00	
Undesignated	9,513.11	
Red Wolf	11,097.33	
Run	145.00	
Turtles	1,330.00	
PI-VCS	900.00	
Total Donations		28,435.44
Interest		301.24
Loan for PI-VCS		15,000.00
Net from Sales		3,192.35
Total Income		46,929.03

Expenses

Audit	650.00	
Administration	698.52	
Memberships	50.00	
Refuge Projects		
Creef Cut	1,687.52	
Milltail/Sandy	1,526.00	
Red Wolf	11,079.40	
Intern/Misc	2,471.51	
Run	60.00	
PI-VCS	30,629.86	
Total Refuge Projects		47,454.29
Total Expenses		48,852.81

Balance 9/30/93 -- \$5,679.98 Balance 9/30/94 -- \$3,756.20

SALES UNIT FINANCIAL REPORT

Income

Sales		
Non-taxable	551.57	
Taxable	19,338.01	
Total Sales		19,889.58

Expenses

Cost of goods	16,092.69	
Sales Tax	466.39	
Other	138.15	
Total Expenses		16,697.23

Net Income 3,192.35

I. EQUIPMENT AND FACILITIES

1. New Construction

A contract was issued to Powerhouse Construction, Wilmington, NC, in September, 1993, to construct metal equipment storage buildings totalling 220' L x 40' W. Total contract amount was \$143,980 and included repainting the "red shed", site work, gravel over roughly 1 acre, 1500' of chain link fence, purchase and erecting the buildings. The contractor began work on 11/15/93 and immediately encountered problems - organic soils and ground water levels virtually at the surface. These early problems were a precursor to many problems with this contract. What should have been a relatively simple construction project turned into a major headache for the staff - mostly due to contractor ineptness. Most footers were finally poured by the end of February, steel set by the end of March, and initial grading/graveling completed by end of May. The contractor's surveyor had misshot the finished grades which resulted in numerous drainage problems. To make a long story short, most of the gravel had to be removed, the site regraded, etc. Powerhouse Construction eventually requested another \$14,000 for these needed changes - their request was denied and as the year ended, this issue was still unresolved. Several subs still have not been paid and are initiating litigation.

An RES was submitted in June for a oil/paint storage building. The contract was awarded to Morgan Construction (Atlanta, GA) for \$24,800 in late September (engineering estimate was \$40K). Although a preconstruction conference was held in November, Morgan had not completed any work as the year ended. CGS eventually issued a default notice in early January, 1995. The remaining bids received exceeded the available funds for this project. If direct negotiations with these companies does not result in a decrease in their bids, the project will have to be rebid.

This refuge received DU Marsh funding to construct an additional 400 acres of moist soil units. The RES/acquisition request was submitted in May and a contract was awarded to Greenville Paving, Greenville, NC in late September. The project consists of constructing 4 miles of levees (est. 34K cu.yds.) along with purchase and installation of 4 WCS's. Once completed, the refuge will have about 2,400 acres of moist soil units capable of being flooded to 50% capacity by gravity flow. Refuge staff completed the survey work and set grade stakes. Unfortunately, the contractor was unable to begin work by the end of the year but assures the staff that work will start in January (the wettest part of the year, of course).

NC Dept. of Transportation (NCDOT) completed a large, paved parking area with assorted landscaping at the Creef Cut kiosk and interpretative trail (see H.4 for details).

2. Rehabilitation

Very little progress was made on the bridge replacement/wetland restoration project during 1994 since most of the refuge equipment critical to continuing this project was loaned to Mattamuskeet NWR during the dry time of the year. Four structures were installed at odd times during the year - 2 structures at Hook x Laurel Bay Roads, 1 at Bear x Borrow Pit Roads, and 1 at Milltail x Sandy Ridge Roads. The Bear Road structure replaced at 30' long wooden bridge that was in horrible condition - and provides water control capabilities on roughly 2,000 acres. This project will take at least another 3 years to complete and will replace 28 unsafe wooden bridges (30-50' in length) with approximately 36 large water control structures and fill. These efforts will eventually restore natural hydrology on 60,000 acres of drained wetlands and at the same time provide much needed access for management purposes. A total of 11 structures have been installed to date which restores hydrology on roughly 20,000 acres along with eliminating some very unsafe bridges.

Two water control structures, controlling about 200 acres of moist soil units, were repaired by digging out, backfilling, pouring concrete, etc. This project turned out to be time consuming - proximity to the perimeter canal system prohibited direct equipment access. Lots of shovel work along with hauling a lot of fill on Mackay Island NWR's flex track! Several other levee leaks were also repaired.



Milltail Road was graveled from Highway 64 to the Maintenance Complex. Finally, all weather access for the crew.

JCJ

The entrance road to the new maintenance area (.7 mi. in length) was graveled using construction account funds. This project required 2,300 tons of gravel delivered at a cost of \$32,000. For the first time since the refuge was established in 1984, the maintenance staff can actually get to work without any danger of getting stuck.



Alligator River Road Improvement Crew - doing what they do best!!! J CJ

3. Major Maintenance

Boundary posting continued to be a high priority item with another 15 miles completed during '94. Approximately 100 miles of exterior boundary remain to be posted.

Improvements to the primary refuge road system continued to be a high priority item. Most refuge roads have become impassible even to 4x4's and this lack of access severely impacting the refuge's ability to conduct management and public use programs. Work on major rehab of the entire 50 miles of primary roads begin in 1992. By the end of 1993, approximately 20 miles had been completed. These efforts continued in 1994 with work concentrating on Long Curve, Borrow Pit, and Milltail Roads. Only slightly over 50% of the planned work was completed due to needed equipment being on loan to Mattamuskeet NWR during the "dry" season. Slightly over 11 miles of road were partially completed by removing all road shoulder vegetation (using KG blade and crawler), recrowning roads, installing 10 culverts, and hauling approximately 2,000 cu. yds. of fill for holes and low spots. Although this work

was not completed due to the onset of wet weather (most of it was done in October and November), the refuge received many, many compliments from refuge users because of these efforts.

Approximately 80 miles of secondary roads had to be worked with crawler tractors and chainsaws removing downed trees following storms.

Equipment repairs were a never ending problem during the year, partially due to a lot of hard work and partially due to using some old equipment. In addition to using all of our rather large supply of "hay bailing" wire, every penny that could be found was spent trying to keep stuff running. A small sample of these problems follows: repair torque convertor on D-6H (\$13K), replace rollers on D-6C, replace brake bands and clutch liners on two D-3's, replace fuel pump on dragline, etc., etc. I'll not bore you with any more details other than to say it was a very trying, hectic year!

4. Equipment Utilization and Replacement

As mentioned above, several pieces of refuge equipment were loaned to Mattamuskeet NWR (excavator, dump truck, dragline, etc.). Refuge staff also assisted them for about 2 weeks.

Several pieces of equipment were purchased during the year. These included: Ford 8830 tractor and 22' disc, 16" relift pump and trailer mounted power unit, and conversion of a cab chassis truck to a wildland engine.



With the arrival of the 180hp 8830 tractor, the refuge staff will finally be able to adequately manage the moist soil units. DS



The bridge trailer received during 1994 will provide fire equipment access across the canals that parallel most refuge roads. JCT

The refuge provided trade-ins for other stations in order to get access to the vehicles they were replacing - their junkers were better than a lot of our regular vehicles!

J. OTHER ITEMS

3. Items of Interest

Project Leader Johnson served as a team leader for the Roanoke-Tar-Neuse-Cape Fear Ecosystem during 1994. He was in travel status for over 5 weeks during August and September attending training or participating in various meetings. This assignment came at an inopportune time - this complex had no assistant managers and no office assistant with end of year stuff to be done.

First ecosystem meeting for this area hosted by Alligator River.

North Carolina refuge cluster meeting was held at Alligator River on 5/19-20.

Vits and Tinsley (RO Realty) visited to assist the refuge in dealing with the revenue sharing payment reduction.

Refuge revenue sharing check of \$166,530 (down from \$362,800 in 1993) distributed to Dare County.

Alligator River was assigned responsibility to coordinate the visit of Russian scientists to military installations and several refuges in North Carolina. Our worst fears were realized - this became a very complex and time consuming process. Washington dreamed up this project and guess who had to do most of the dirty work?

Refuge hosted a NC Wildlife Society chapter meeting on the 28th. Several of the Wildlife Resource Commissioners and state soil and water district commissioners attended.

Ruth Slette and Marsha Stokes, CGS, conducted a procurement audit on 8/9-10. In case you are wondering, the refuge staff did survive.

Numerous Air Force personnel visited the refuge during the year to discuss various items - ranging from water management to endangered species management.

A seemingly endless string of university professors, graduate students, state agency and other federal agency personnel visited to discuss research projects, environmental compliance issues, etc.

4. Credits

The Narrative Report was a joint effort by the entire staff.

PEA ISLAND NATIONAL WILDLIFE REFUGE

Manteo, North Carolina

ANNUAL NARRATIVE REPORT

Calendar Year 1994

U. S. Department of the Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

INTRODUCTION

Pea Island National Wildlife Refuge was established in 1938 by Executive Order 7864 as a wintering area for the greater snow goose and other migratory waterfowl. At the last survey, the refuge contained 5,915 acres of beach, dunes, high marsh, dikes, salt marsh, impoundments, ponds, and salt flats; however, severe ocean overwash and beach erosion have caused the loss of a portion of the beach/dune acreage. Presidential Proclamation #2284 closed 25,700 acres of adjacent waters in the Pamlico Sound to migratory waterfowl hunting.

The refuge is located on the north end of Hatteras Island, a coastal barrier island which is part of a chain of islands known as the Outer Banks. These islands are separated from the mainland by a series of marshes and/or sounds which are up to 25 miles wide.

Located within the boundaries of Cape Hatteras National Seashore, Pea Island is approximately 175 miles east of Raleigh, NC and 225 miles southeast of Washington, DC.

Pea Island's climate is generally moderated by the ocean, thus it is cooler in the summer and warmer in the winter than the NC mainland. The average daily maximum temperature is 69 degrees and the minimum is 56 degrees. Due to heavy and prolonged storms, the average rainfall is 55.6 inches, most of which occurs during the winter and summer. It is frequently windy during both day and night with 11 mph as the annual mean wind speed. The prevailing summer wind is from the southwest, and winds are usually from the northeast in the winter.

The diversity and abundance of bird life on Pea Island explains its reputation of being a "birder's paradise". The refuge is an important wintering ground for tundra swans, Canada geese, snow geese, and over 25 species of ducks. Many other interesting bird species can be found at Pea Island during the winter months and during spring/fall migrations. During the summer months, several species of herons, egrets, ibises, terns and gulls, along with American avocets, willets, black-necked stilts, other wading and shore birds and a few species of ducks nest on the refuge. Peregrine falcons, bald eagles, piping plovers, and loggerhead sea turtles are among the endangered or threatened species that utilize the refuge.

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A. HIGHLIGHTS

The long awaited Pea Island Visitor Center officially opened on July 26, 1994 (see Section E.4.).



**Pea Island Visitor Center.....at long last!!
1/95 BWS**

Banner Year for sea turtles....(see Section G.2.).

North Pond water levels uncontrollable - resulting in poor duck food production (see Section F.2.).

B. CLIMATIC CONDITIONS

Pea Island NWR enjoys fairly mild temperatures most of the year. Table 1 shows the monthly weather information for 1994. It was a relatively quiet weather year for Pea Island. January produced a cold spell that froze the headquarters well system, caused ice to form in the impoundments, and froze dirt in truck beds of a contractor doing mitigation work. Below average spring rains adversely affected water levels in the ponds, as well affected by the lack of pumps. The big storms didn't hit until the latter part of 1994. Hurricane Gordon passed within 90 miles of the Outer Banks on 11/18 and, although no major damage occurred to any real or capitalized

property, the beach was pounded for 20 hours with 20'+ waves causing a lot of beach erosion and breaches in the dune line (see Section F.1.). On 12/22-24, another severe storm, a nor'easter, battered Pea Island. Other than beach erosion and dune breach, again the refuge was spared any major damage.

TABLE 1
PEA ISLAND NWR WEATHER DATA

<u>MONTH</u>	<u>TEMP.</u> <u>HIGH</u>	<u>TEMP.</u> <u>LOW</u>	<u>RAINFALL</u>	<u>RAIN DEP</u> <u>FROM</u> <u>NORMAL</u>	<u>TEMP DEP</u> <u>FROM</u> <u>NORMAL</u>
January	67	16	7.44"	+2.14	+1.0
February	73	29	3.13"	-0.99	+3.2
March	77	35	7.08"	+2.79	+2.1
April	86	42	1.26"	-2.27	+6.8
May	85	46	4.66"	+0.66	+0.2
June	92	59	2.26"	-1.85	+3.6
July	95	66	16.07"	+11.09	+3.6
August	91	61	4.00"	-2.00	+0.3
September	89	54	9.67"	+4.40	-0.8
October	83	49	9.47"	+4.49	+0.7
November	79	35	5.57"	+0.60	+5.0
December	74	44	4.90"	+0.36	+7.3

C. LAND ACQUISITION

2. Easement

The saga of the Oregon Inlet Coast Guard station continued through 1994. This 10 acre inholding and old station building was quit-claim deeded to the county in 1992. Early in 1993, a group of individuals claiming to be heirs of the original owner (who sold the land in 1878 to the Coast Guard) filed a deed to the property based upon a "reversionary clause" in the Coast Guard title, posted the site, and moved a caretaker into the building. They threaten to sue if the county attempts to exercise it's quit-claim deed. The group now has placed the property on sale - for \$1 million. Rumor has it local

developers are considering purchase and construction of condominiums - in the middle of a National Wildlife Refuge. That part of the site that was refuge property under easement to the Coast Guard has now reverted back to refuge management. The Coast Guard finally issued a contract for removal of all their improvements (a building, pier, seawall, etc.) in December of 1994 - a condition of their easement agreement. Further checks into the status of the 10 acre inholding revealed that the Park Service had instituted a taking of all land contained inside the boundaries established for the Cape Hatteras Seashore by Congress in the early 1960's. This taking document along with the title work provided by the "heirs" was submitted to the Regional Solicitor in late summer for a ruling on who had legitimate title. Stay tuned for the next addition of the narrative for results.

D. PLANNING

2. Management Plan

The annual water management plan for all impoundment units was completed and approved.

A prescribed burning prescription and Section 7 covering 4,500 acres was written and approved.

Compatibility determinations were completed on all secondary uses.

Sea turtle nest report summarizing results of the 1994 nesting season completed.

4. Compliance with Environmental and Cultural Resource Mandates

Refuge staff attended numerous meetings during the year associated with NC DOT plans to relocate 3.3 miles of NC Hwy. 12. Relocation of this highway segment is absolutely essential since most of it literally sits atop the beach. Even lunar tides often result in water on the pavement in several locations. The frequent Atlantic Coast storms result in highway closure for days during each storm event, stranding the 5 towns that occur south of the refuge. Refuge staff has been a proponent of relocating this highway segment for several years. As 1994 came to a close, NCDOT had completed the NEPA process and finally provided the refuge with a R-O-W permit package.

R-O-W permit and SUP were issued to Cape Hatteras Electric for establishing a new substation on the north end of the refuge and repoling the line that crosses the refuge. All

environmental requirements were completed, including EA, Section 7, and compatibility determination.

Numerous SUP's were issued to USCOE and NCDOT authorizing various actions during the year. Compatibility determinations were completed for these actions.

The refuge staff attended several meetings during the year with the USCOE pertaining to the Oregon Inlet Jetties. The subject of most of these meetings was the Design Memorandum for the sand bypassing plan. As the year ended, this plan was nearing completion and will be sent to Washington for review. Several Washington USCOE staff are obviously opposed to this project and seem to be insisting on some conditions in this plan that they know the Service cannot accept - attempting to use the Service to delay or kill the project?

Several pages of text could easily be written summarizing the activities/actions associated with Oregon Inlet Jetties, beach nourishment, dune construction, relocating parts of NC Highway 12. Refuge staff participated in many, many meetings with USCOE, NCDOT, ES, other state agencies, and local officials over the course of the year.

More to come in '95, for sure! These and other issues will continue due to proximity of refuge to Oregon Inlet, presence of NC Highway 12 - the only road to 7 villages south of Nags Head, and strong political clout by Outer Banks politicians.

5. Research and Investigation

Refuge staff continued indepth data collection along refuge beaches throughout the year as part of the monitoring plan examining effects of USCOE disposal of dredge material. This plan, developed by the refuge, was modified this year to cover 6 miles of beaches. Exhaustive sediment sampling (over 3,000 individual samples), along with beach slope, composition, scarp, and fauna data were collected on some 80 transect lines. In addition to collecting the transect data biweekly, intensive sampling periods (24 hr. duration) were initiated 3 times during 1994 to document micro environmental changes that could impact fauna numbers (ambient air temps, water temps, tide stage, moisture conditions in beach sands, etc.). Identifying environmental conditions that influence fauna numbers will assist in evaluating effects directly associated with nourishment. All data samples, etc., were delivered to Coastal Research Associates, UVA, for completing analysis and report writing. Coastal was issued a contract for this project using USCOE transfer funds.

Dr. Robert Dolan continued to serve, under contract, as the Service's technical representative on the NCDOT Groin Monitoring Team.

Refuge has begun the process of taking compaction readings at each turtle crawl to develop baseline data for use in imposing special conditions on SUP's issued to USCOE and NCDOT for beach nourishment.

6. Other

North Carolina Division of Coastal Management (CAMA) issued a violation notice to NCDOT for some of the emergency repair work performed following a severe nor'easter in December. NCDOT moved sand outside their R-O-W during efforts to remove sand from NC Hwy. 12 at several locations, including locations on Pea Island. Early reports by the media associated the refuge with having initiated this action - more controversy to try and put to rest.

E. ADMINISTRATION

4. Volunteer Programs

During 1994, volunteers at Pea Island again formed the hub, in spirit, for the entire Alligator River volunteer program. The Host/Hostess Program began in April and continued through Thanksgiving. Until July, a few week-ends were covered. In July, the long-awaited Visitor Center opened, and life will never be the same at Pea Island!! From the opening through Thanksgiving, the Center was staffed 7 days each week. During December, it was open Fridays, Saturdays, and Sundays, except Christmas and New Year's Days. Plans for 1995 are to open Fridays/Saturdays/Sundays during January/February, Thursdays/Fridays/Saturdays/Sundays during March, and 7 days each week from April through Thanksgiving. A big summer and fall is anticipated!



Volunteer Don Perry -- doing what he does best!
3/95 BWS

The Turtle Patrol continued to be a popular volunteer program during 1994. Turtle patrollers participated in an 8 hour training program, then conducted the patrol 1 day each week from mid-May through the end of August. And, what a year it was for turtles!! (See Section G.2.)

The Turtle Watch Program was continued as in the past several years. This year, with so many turtle nests to watch and so many baby turtles scurrying everywhere, Turtle Watch utilized many folks for many hours. (See Section G.2. for details.)

Summer and fall bird walks and summer Children's Wildlife Discovery programs were conducted by volunteers. Special programs requested by schools and other groups were also conducted by volunteers. In fact, essentially all public programs conducted during 1994 at Pea Island NWR were done by refuge volunteers.

The September "Big Sweep" occurred again in 1994; 21 volunteers participated and succeeded in cleaning 6 of the 13 miles of refuge beach. Most years, each group is asked to clean up the beach on their first pass and walk back along the highway, cleaning road shoulders on their way back to their vehicles. During the 1994 Sweep, the bugs were so bad, folks were advised to hurry back to their vehicles!!

For additional information about the Volunteer Program, see Section E.4. of the Alligator River NWR Annual Narrative Report.

F. HABITAT MANAGEMENT

1. General

Pea Island, a coastal barrier island, consists of 7 basic habitat types. The most recent survey revealed 456 acres of ocean beach; 518 acres of barrier dune; 630 acres of sand ridge, brush, and grassland; 3,024 acres of irregularly flooded salt marsh; 328 acres of salt flat; and 3 brackish water impoundments totaling 940 acres. Beach and dune acreages change from year to year.

Hurricane Gordon's approach to within 90 miles of the Outer Banks on November 18-19 provided plenty of pre-holiday excitement. The Hurricane Contingency Plan was activated on the 18th - all buildings were boarded up, staff was evacuated, impoundment unit WCS's were opened to begin dewatering, etc., etc. This effort was unnecessary (thank goodness!) since Gordon headed back south on the 19th. Waves exceeding 20 feet pounded the Outer Banks for 20 hours resulting in lots of beach erosion and more breaches in the primary dune line.

Highway 12 was closed for 36 hours and several sections of pavement at the sand bag area were damaged. No direct damage to refuge real or capitalized property was sustained. A lot of sea water intrusion into South Pond and New Field occurred, elevating salinity levels to greater than 20 ppt. All in all, it was a lucky day for Pea Island.

The pre-Christmas winter storm caused some overwash and erosion, but no significant damage occurred. Highway 12 was closed for approximately 3 hours.

The Beach Renourishment Monitoring Project ended during the fall. A final report is expected in early 1995. It appears that some interesting facts about indicator species, impacts of beach nourishment, and management of dredged materials disposed of on the beach will be learned.

Plans are underway to relocate Highway 12, with construction expected in 1995. Wetlands will be created on sand blows and the grain field will be rehabilitated and planted as partial mitigation for impacts from road relocation.

2. Wetlands

Considerable difficulty in maintaining target water levels in North Pond resulted in low productivity during the 1994 growing season. Sago pondweed and widgeon grass occurred in 32% of the sample points in 1993 but decreased to 18% in 1994. (Table 2). This is comparable to pre-drawdown production of only 19% and 16% of these 2 excellent waterfowl food species in 1990 and 1991, respectively. Approximately 43% of North Pond was bare. The Salt Flat area was not sampled in 1994 due to staff shortages and work loads.

Table 2
Summary of Vegetative Transect Line Sampling
Pea Island NWR, 1994

Line	Feet Sampled	Sample Stops	Sampling Points	Percent Vegetated	Percent Bare	Plants per Point
New Field	3,210 ft.	75	375	94.0%	6.0%	1.3
South Pond	2,340	78	390	97.0%	3.0%	1.5
North Pond	2,400 ft.	71	355	57.0%	43%	1.4
Salt Flats	Not sampled					
TOTALS	7,950	224	1,120			
AVERAGES	---	--	---	82.7%	17.3	1.4



WB Stanton, ARM Parks, and WHM Biologist Noffsinger
conduct the annual vegetative transects on Pea Island.
The old teaching the new! 10/95 DS

New Field impoundment produced a good crop of Sago pondweed (36%). Salinity levels remained within target ranges until the November overwash where they became elevated due to intrusion of ocean water.

South Pond became mostly a mud/sand flat early in the summer but a marathon effort by staff to flood by wind tides had positive results. Sago pondweed and other species rated as good waterfowl food were found on 48% of points sampled. Food species rated as fair for waterfowl were found on 41.4% of points sampled. Salinity elevated to near 20 ppt after the November storm due to ocean overwash.

Wetlands in the Salt Flats are flooded and dewatered by natural ebb and flow in wind/tides and by rainfall/runoff. Vegetation has remained relatively unchanged for many years in this area. The predominant vegetation is glass wort (Salicornia sp.), sea oxeye, and patens.

The 2 small mitigation ponds near the southern boundary created by NCDOT again produced good widgeon grass. The pond fringes also continued to produce stands of Bacopa sp., Scirpus sp., and Cyperus sp. Waterfowl use is moderate and appears to be increasing.

4. Croplands

Much of the plantable area of New Field has been affected by sand deposited by overwash and salt concentration. No crops were planted in the plantable areas during 1994. The field will be shifted to the east with relocation of Highway 12 in 1995 and will be planted to a permanent pasture with turf-like species.

9. Fire Management

A total of 2641 acres were burned on December 19-20. About 75% of fuels were consumed.



Prescribed burn lights up the late afternoon sky.
Beautiful!

12/95 DS

G. WILDLIFE

1. Wildlife Diversity

Pea Island has a high natural diversity of habitat types. Habitat management practices, such as prescribed burning, moist soil management, disking, brush removal, and green browse planting, serve to enhance habitat and wildlife diversity. Pea Island provided habitat for a wide variety of mammals, birds, fish, reptiles, amphibians, mollusks, and crustaceans during 1994. This diversity was especially evident in birds; more than 315 species of birds have been identified in the area.

2. Endangered and Threatened Species

a. Federally Listed and Endangered Species

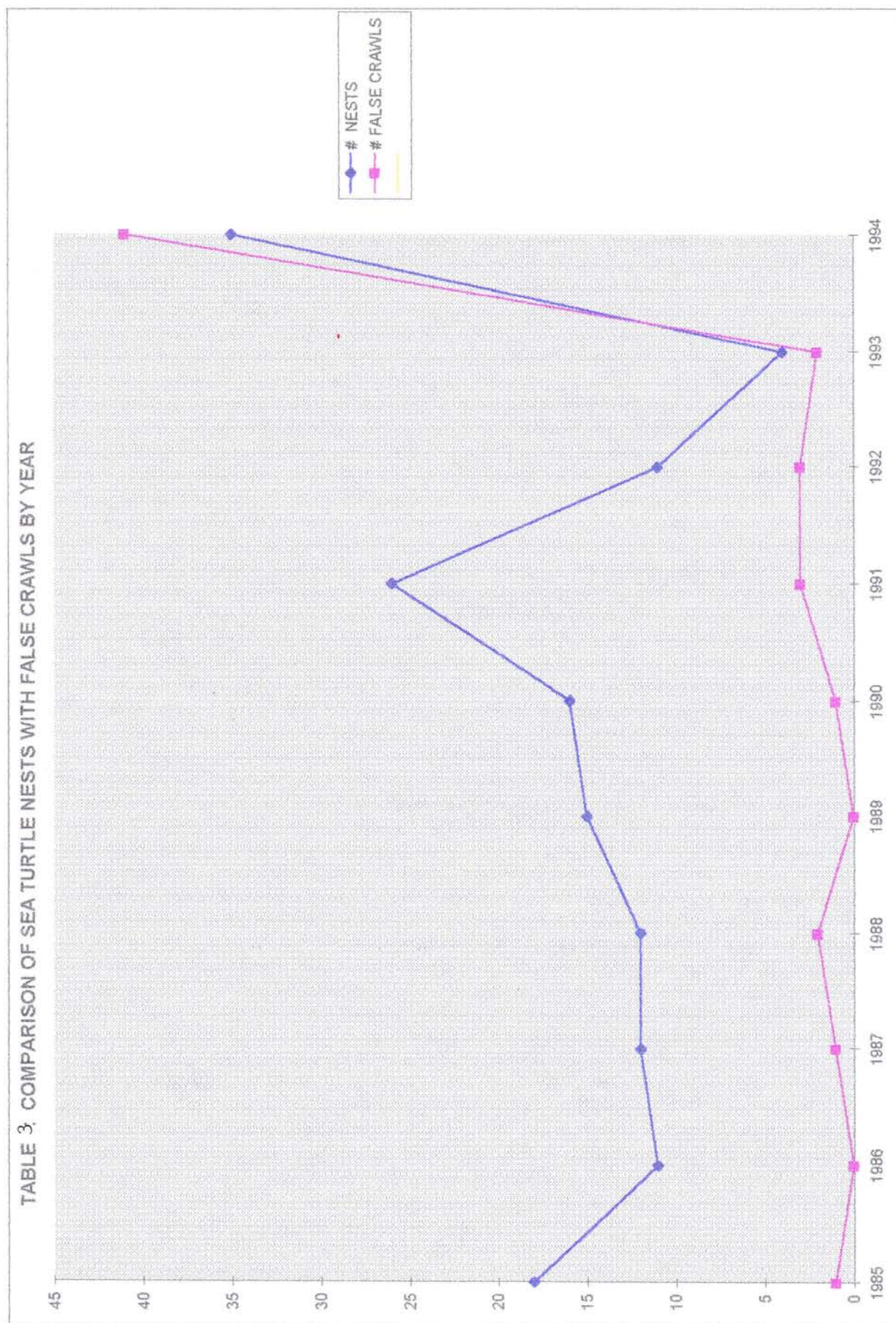
American bald eagle (Endangered): Bald eagles, *Haliaeetus leucocephalus*, often pass over Pea Island. One immature bald eagle was observed on several occasions during 1994. The bird was later found weak and unable to fly near Avon, North Carolina. The eagle was captured and transported to a raptor rehabilitation center in Charlotte, North Carolina. As of this writing the status of the eagle is unknown.

Peregrine falcon (Threatened): The Arctic peregrine, *Falco peregrinus tundrius*, is the subspecies of peregrines most often seen at Pea Island. Peregrine falcons were sighted by staff on 3 different occasions at Pea Island.

Piping plover (Threatened): The Atlantic coast population of Piping plover, *Charadrius melodus*, was listed as a threatened species under the Endangered Species Act in January 1986. Although piping plovers have been observed on Pea Island in the past, there were no recorded sightings by staff during 1994.

Atlantic loggerhead sea turtle (Threatened): The loggerhead sea turtle nesting season of 1994 on Pea Island National Wildlife Refuge hit an all time record compared to previous years. Pea Island has had an average of 14 nests with the highest number occurring in 1991 (26 nests and 4 false crawls) (See Table 3). This year 35 nests were deposited on Pea Island. In addition, 7 more were relocated to Pea Island from the National Park Service (NPS) beaches, and there were 41 false crawls (2 were reported from NPS). Since dune and beach erosion and ocean overwash continued to be major problems, a section of beach was designated "safe" for relocation purposes. Thus, instead of relocating nests to sites up and down the beach, all but 3 nests were relocated to the "safe" area. No major storms hit Pea Island during the 1994 nesting season; however, twice during the months of September and October, Pea Island experienced some gale force winds causing extremely high tides and heavy winds depositing water and sand on the nests. A few eggs from unhatched nests were damaged. The overall hatch rate was approximately 41.2%, including NPS nests relocated to Pea Island. For Pea Island alone, the rate was 40%. A big problem this year (as in previous years) was ghost crab predation - these crabs were the number one enemy of hatchlings. In previous years, many turtles hatched out of nests but never made it to the water. "Reinforcement" crabs actually formed a line along the uprush zone to capture the few turtles that had managed to crawl safely through a beach covered with hungry, hunting ghost crabs. Feral cats were also a problem. These animals were removed from the nesting area.

TABLE 3. COMPARISON OF SEA TURTLE NESTS WITH FALSE CRAWLS BY YEAR





Not all female sea turtles know exactly where
they're going! 7/94 JL

Once again, the Turtle Watch Program was implemented. It entailed digging a 10" deep by 10" wide trench from nests to the ocean. Volunteers started watching each nest at day 55. They arrived just before dusk and swept the trench smooth; wire cones were placed around the nest with a "sliding board" emptying into the crab free trench. Turtles followed flash-lights (which volunteers leap frogged) to the end of the trench and arrived safely at the ocean. It was necessary to "steer" turtles because of light pollution, primarily from an amusement park at Rodanthe, approximately 5 miles south of the safe area. Monitoring nests took an intensive effort on both staff and volunteers; however, it played a vital role in greatly increasing survival of hatchlings from nest to ocean.

At season's end, a decision was made to relocate all nests to a "safe" area in the future. The decision was made after input from other biologists and much deliberation. Most, if not all, of the nests would have been lost to salt water inundation from high tides and storm surges had they been left in their original locations. The 3 that were left happened to be in safe locations. The decision to relocate all the nests was also due to the high number of nests this year, and shortage and sanity of refuge staff! The Turtle Watch Program also greatly increased the number of hatchlings reaching the ocean. Observations in past years indicated that, on some nights, as many as 75% of hatchlings were lost to ghost crabs (prior to trenching). Survival rates to the ocean after trenching approached 100%. If the same narrow beach is evident next year, a similar program will again be implemented.

Several stranded turtles washed up on Pea Island's beaches in 1994. Approximately 25 dead loggerheads were measured and recorded.

Green sea turtles (Threatened): In 1993, the first Green Sea Turtle (*Chelonia mydas*) nested on Pea Island. None were reported for 1994.

b. State Listed Endangered and/or Threatened Species

Of the other species that occur on the refuge, the State of North Carolina lists 7 as threatened and 26 as species of special concern. Although the refuge is not managed for all these species, present practices do provide benefits for many of them. Species specifically managed for are:

Osprey (Special Concern): Two platform nests at Pea Island were known to have produced fledglings. Sightings for 9 adult ospreys were recorded by staff during 1994.

Least tern (Special Concern): Historically, least terns have nested 1.5 miles south of the Pea Island NWR Headquarters. For 1994, 162 least terns were observed during the summer shorebird surveys. Nesting colonies were observed at the South Pond sandbars and at Oregon Inlet.

3. Waterfowl

Waterfowl surveys were conducted from October through January. Waterfowl numbers peaked at 14,014 during November. Percent difference compares use days by species for the 1993-1994 season versus the mean use days by species for the past 5 years (Table 4). Mergansers and buffleheads showed an increase in number of use days for the 1993-94 season; all remaining species showed a decline (Table 4). Snow goose activity increased in the salt flats following the December prescribed burn.

Two ground brood count surveys were conducted on Pea Island. Three black duck and 11 gadwall broods were observed in New Field Pond. North Pond had 2 Canada geese and 2 gadwall broods. One Canada goose brood was observed in South Pond.

Several black-crowned night herons were observed on the finger islands in the impoundments during the summer. This suggested nesting activity; however, no nests were confirmed.

Table 4
Composition of Wintering Waterfowl, Pea Island NWR
1993-1994

SPECIES	PEAK PERIOD	PEAK #	% USE DAYS	# USE DAYS 1993-94	MEAN # USE DAYS 1989-93	% DIFFERENCE
Canada goose	Dec	303	2	15738	48721	-32
Snow goose	Jan	1529	7	61539	169218	-36
Tundra Swan	Nov	1982	11	103463	151380	-68
Wigeon	Nov	5449	38	285346	317005	-90
Pintail	Nov	2584	31	232380	295602	-78
Black duck	Nov	694	9	64871	105062	-61
G.W. teal	Jan	278	0.7	5070	176680	-3
Shoveler	Jan	770	7	49870	86185	-57
Gadwall	Dec	405	4	33810	89319	-37
Unknown Ducks	Jan	129	0.8	6056	27381	-22
Merganser	Jan	491	3	23434	20336	*87
Ring-necked ducks	Jan	128	.5	3793	8811	-43
B.W. teal	Oct	68	.3	2232	13343	-17
Ruddy duck	Jan	214	2	10668	23850	-44
Mallard	Jan	83	0.7	5023	5453	-92
Bufflehead	Dec	789	2	16858	15683	*93
Scaups	Jan	76	0.3	2308	30120	-8
Redhead	---	0	0	0	3311	0
Canvasback	Jan	3	0.01	93	972	-9

An avian cholera outbreak occurred in March. Refuge staff spent many days patrolling the beach and picking up bird carcasses (loons, old squaws, gulls, and cormorants) to prevent the spread of the disease. All carcasses were transported and burned at the North Carolina State Health Lab in Edenton. Refuge staff also assisted the North Carolina Wildlife Resource Commission and the National Park Service in removing dead birds on other Dare County beaches.

4. Marsh and Wading Birds

Marsh and wading bird surveys were conducted from June through October (Table 5). Bird numbers peaked at 823 during October. A great white heron, native to south Florida, was frequently observed in North Pond.

Brown pelican numbers have continued to increase over the past few years as the species has expanded northward into coastal North Carolina and Virginia. These birds were previously listed as a threatened species in this state and were rarely observed.

5. Shorebirds, Gulls, Terns, and Allied Species

Shorebird surveys were conducted from June through October (Table 6). Shorebird numbers peaked at 9029 in July. This peak was the highest in 3 years. A large colony of nesting black skimmers was observed on the beach about 1.5 miles south of refuge headquarters. A large nesting tern colony occurred at the pan that formed behind the rock revetment at Oregon Inlet. Both areas were posted as closed to public access.

6. Raptors

Carolina Raptor Center did not band this year. Also, see Section G.2. for information on peregrine falcons and bald eagles.

7. Other Migratory Birds

The diversity of bird life on Pea Island is so great that it is sometimes referred to as a "birder's paradise". This is especially true when considering the passerine species. Some 115 different species of song birds migrate through Pea Island.

Table 5
Species composition of marsh and wading birds
surveyed from June to July 1994 at Pea Island NWR

Marsh/Wading Birds	June	July	August	September	October
Pied-billed grebe	1	3	no survey	118	211
Double-crested Cormorant	14	45		80	164
Eastern brown pelican		8		46	17
White ibis	34	121		22	76
Glossy ibis	27	92		4	
American bittern					1
Great blue heron	3	3		9	10
Great egret	53	100		94	98
Snowy egret	42	23		33	
Tri-colored heron	23	137		42	31
Little-blue heron	11	31		20	14
Cattle egret	2			33	1
Green heron		2		2	
Black-crowned night heron	2			8	3
Yellow-crowned night heron					2
Clapper rail					1
Common moorhen	1	1			1
Great white heron				1	1

Table 6
Species composition of shorebirds
surveyed from June to July 1994 at Pea Island NWR

Shorebirds	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
Greater black-backed gull	1	3	no survey	113	58
Herring gull	41	76		66	71
Ring-billed gull		1		3	4
Laughing gull	21	31		30	1
Caspian tern	2			102	16
Royal tern	3	47		16	2
Sandwich tern	5	71		5	
Forester's tern	2	15		393	46
Common tern	4	333		2	
Least tern	48	112		2	
Black tern	28				
Black skimmer	5	61		648	28
Avocet	40	3		26	48
Black-necked stilt	16	28			23
Common snipe	122				
Short-billed dowitcher	592			19	190
Long-billed dowitcher		519			
Least sandpiper		1394			3
Semi-palmated sandpiper	8	1517		3682	
Sanderlings		4215			
Greater yellowlegs	16	120		27	52

Lesser yellowlegs		61		9	10
Willet	52	305		146	172
Spotted sandpiper		2		1	1
Western sandpiper				1	98
Whimbrel		50			
Black-bellied plover	2	8		94	10
Semi-palmated plover		20		193	9
Ruddy turnstone	1				
American oystercatcher	1	26		20	
Marbled godwit	2	2		37	55
Stilt sandpiper		8			
Dunlin					8
unidentified species				430	

8. Game Mammals

Cottontail and marsh rabbits are fairly common on Pea Island. Declines in numbers from a few years ago seem to have reversed. Raccoon tracks have been observed with increasing frequency. In the past raccoons were incidentally captured in cat traps.

Presence of scat and tracks indicate a continued presence of foxes and opossums. The presence of these species as well as feral house cats may be one of the causes for the decline in pheasant populations.

Deer tracks have frequently been observed around North Pond, New Field, and South Pond, and in the Salt Flats. Staff members have seen both does and bucks on Pea Island. Does this mean that deer herd management may be on the horizon?

River otters have been observed in the impoundments. Muskrats, nutria, and mink are also present on Pea Island.

9. Marine Mammals

Hurricane Gordon washed ashore a male bottle-nosed dolphin. The dead dolphin was discovered by refuge staff in front of New Field Pond shortly after the storm. Several dead bottle-nosed dolphins washed onto the beach during the year - the causes of death were not determined.

10. Other Resident Wildlife

In past years, ring-necked pheasants were occasionally observed in salt marsh, brushland, dunes, and in the Pea Island farm field. Sightings have decreased in recent years. The exact status of pheasant population is unknown. There were no pheasant sightings in 1994.

15. Animal Control

Feral cats continued to be a problem with nesting birds, waterfowl, and turtles. Cat tracks were found from the beach to the sound. Cats were not actively trapped this year. One cat was eliminated from near a turtle nest.

16. Marking and Banding

Pea Island staff and staff from the North Carolina Wildlife Resources Commission participated in the sub-species Atlantic Flyway Canada Goose study for the 1993-94 season. Rocket nets were used to capture 38 Canada geese on Pea Island. Captured geese were fitted with neck collars and leg bands.

Due to work load and staff changes, the Gypsy Moth Pheromone Trapping Program was not monitored at Pea Island. Traps are planned to be set in 1995 and will be closely monitored. However, results from 1993 monitoring revealed a relatively high number of moths which is not surprising since Pea Island is located in the quarantine area.

H. PUBLIC USE

1. General

Based on the National Park Service vehicle counter at Bodie Island and adjusted according to new configurations from RMIS, estimated visitation to Pea Island NWR during 1994 was 1,261,416. The Host/Hostess program continued to provide visitor information and operate the Coastal Wildlife Refuge Society's sales unit at the Visitor Contact Station from



The Visitor Center features several habitat cubes, 6 interpretative panels, leaflets, a book store, and..... 1/95 BWS



.....a smiling face to greet each refuge visitor. 1/95 BWS

April-July. Once the new Visitor Center opened, Pea Island visitor services improved about 5,000%!! The Center is bright and cheerful - just right to match the folks who work there! The Visitor Center is the perfect hub for the interpretive/educational programs of this refuge. (See Section H.6. for details and photos!)

As in the past, public demand for beach access has increased and the amount of undeveloped beach frontage property locally available has decreased. Towns and villages in the area are supported almost entirely by the tourist industry, yet the burden to supply services for these visitors is thrust toward the federal government. The NPS expands its services as the budget allows. The Pea Island Master Plan established a maximum number of parking spaces on the refuge. At Pea Island, public use efforts continue to be governed by the limits set up in the Master Plan, thus providing some relief from the constant demand for more and more access. Refuge efforts continue to aim toward a high quality visit, as opposed to more visits.

2. Outdoor Classrooms - Students

The emphasis on non-staff conducted activities continued during 1994. School groups, scouts, etc. were encouraged in the independent use of the refuge for educational activities. Marsh investigation equipment (seines, mud sieves, etc.) was available for loan from the Visitor Contact Station (VCS). Table 9 in the Alligator River ANR includes off-refuge educational programs conducted associated with Pea Island, as well. Since no registration was required for the use of outdoor classrooms, the refuge has no record of the actual number of such uses that occurred. Volunteer and staff lead programs are listed with interpretive programs in Table 7. On the whole, this type of use is increasing on Pea Island.

4. Interpretive Foot Trails

The North Pond Trail Upgrade and Renovation Project was finally completed during 1994. After construction of the new Visitor Center, the Society contracted with Paul Creef to build the T-shaped overlook that would finish North Pond Trail. The overlook was finished in the fall. Many, many visitors comment that North Pond Trail is the nicest trail they've used in eastern United States. It offers full handicapped accessibility, 7 permanently mounted spotting scopes, and 4 major observation structures. The new Visitor Center at its trail head provides just the right opportunity to provide information to refuge visitors and teach the message of the Service. Approximately 172,198 visitors utilized North Pond Trail (self guided). Another 2,000 or so visitors participated in conducted trail walks, and an additional 170,798 utilized observation platforms at the head of the trail.



North Pond Trail currently has 7 permanently mounted binocular spotting scopes. The handicapped accessible scopes are designed for children and persons confined to wheelchairs, but are utilized by all.

8/94 BWS



New "Y" shaped overlook on North Pond Trail - the only clear view of New Field Pond - completes the upgrade of North Pond Trail.

9/94 BWS

6. Interpretive Exhibits/Demonstrations

The 2 interpretive kiosks provide valuable information on a 24 hour basis for refuge visitors. In July of 1994, the Pea Island Visitor Center was completed and opened to the public. The Center is totally staffed by volunteers. Exhibits were designed and fabricated by Wilderness Graphics and were ready in December; however, staff schedules didn't allow pick-up until January. As usual, the exhibits are beautifully done, and the price was quite reasonable. The refuge has waited many years for a public use facility at Pea Island. The fact that this Visitor Center was a result of the hard work and constant prayers of so many people makes it even more special. Many thanks for the support/tolerance received from RO; "ya done good!"

7. Other Interpretive Programs

Special programs presented off refuge during 1994 are included in Table 9 of the Alligator River ANR. All regularly scheduled (summer and fall) interpretive programs during 1994 were conducted at Pea Island by refuge volunteers. Four bird walks and 2 Children's Wildlife Discovery Programs were scheduled each week during June, July, and August. Birdwalks were scheduled on Saturday mornings during the fall. Participation in these regularly scheduled public programs and other special programs is presented in Table 7.



Volunteer Win Copeland has conducted Children's Wildlife Discovery Programs twice a week all summer for 5+ years. 8/94 BWS

Table 7
Pea Island
Interpretative/Educational Programs (On-Refuge)

<u>Program Type</u>	<u>#Programs</u>	<u>Total #Partic.</u>
Summer Bird Walks	47	664
Children's Wildlife Discovery	24	458
Fall Bird Walks	10	129
Special Bird Walks	15	387
Special Marsh Programs	5	164
Other Educational Programs	6	115

Note: Off-refuge programs included in Table 9 of AR ANR.

9. Fishing

Pedestrian surf fishing continued to be the major form of consumptive, wildlife-oriented recreation on Pea Island during 1994. Bluefish, spot, pompano, croakers, and trout were the major fish caught. A total of 380,702 visits were spent fishing. The annual Fishing Rodeo was held the second Saturday in June with 100 participants.

11. Wildlife Observation

Pea Island continues to be a "birder's paradise". Though numbers of some species, waterfowl in particular, have declined in recent years, the rich diversity continues to draw crowds of bird watchers year-round.

Due to the location of the road (NC Highway 12) through Pea Island, it is difficult for a traveler to pass without observing wildlife. On most days of the year, the quality of observation is quite high. During fall and winter, greater snow geese frequently feed on the road shoulders.

During spring and summer, cattle egrets replace snow geese as the most easily observed wildlife. Various species of raptors utilize the dunes, power line poles, and sign posts for resting and hunting.

The number of birders requesting special permission to bird in the closed areas of the refuge continued to remain low during 1994 as was expected. During 1990, South Pond was drawn down for management purposes, creating excellent wading and shore bird habitat. Several rare species, including curlew sandpipers, white-winged terns, and others attracted "life listers" from all over the country. Since then, things have continued to be calm.....

Refuge trails and other access points are located to make wildlife observation (on foot) easy and enjoyable. In choosing the North Pond area for a focal point for public use and closing the areas around the other 2 impoundments, the

needs of the public were seriously and diligently considered. There are many refuge visitors who realize and support this policy. An estimated 592,567 visitors spent time in association with wildlife observation during 1994.

12. Other Wildlife Oriented Recreation

In the past, a few well placed photo-blinds have provided limited numbers of refuge visitors with a unique opportunity to photograph wildlife. Several years ago, Hurricane Gloria destroyed the few blinds available at Pea Island. Since then, several special requests have been sent to RO for funding, when opportunities were offered. It is hoped that, eventually, photo/observation blinds may be constructed.

It is still our contention that the best photographs at Pea Island have resulted from being in the right place at the right time with a camera in hand.

15. Off-Road Vehicling

The use of ORV's on Pea Island is restricted to NC Highway 12. Illegal ORV traffic continues to plague the refuge; however, probably due to rapid erosion of the beach and repeated ocean overwash of NC 12 on Pea Island, 1994 has been another year of few ORV-related violations. As long as there is a physical way for vehicles to reach the beach, there will always be some problems with ORV traffic there.

As public use of Outer Banks beaches continues to increase dramatically, the importance of the few remaining tracts of natural, relatively undisturbed beach habitat is becoming increasingly apparent for gulls, terns, shorebirds, and allied bird species. It appears from weekly surveys conducted at Pea Island and along other beaches in Dare County, including Cape Hatteras National Seashore, that increasing human activity on beaches is adversely affecting bird use of this important habitat. The birds are simply avoiding areas of heavy to moderate human use and are concentrating on beaches where public access is limited and the numbers of swimmers, sunbathers, surfers, and fishermen are low. Refuge beach areas that show any evidence of nesting activity are closed to public entry.

16. Other Non-Wildlife Oriented Recreation

Because Pea Island is associated with the "beach scene", non-wildlife related recreational activities will always occur on the refuge. Swimming, surfing, and sunbathing are major summer activities. The refuge provides no facilities and few services for these activities.

17. Law Enforcement

Due to a MOU with Cape Hatteras National Seashore, the NPS has the primary responsibility for non-wildlife related public use on Pea Island. For this reason, a law enforcement presence is maintained regularly, though not constantly, on the refuge.

With the training of Bio-tech Elmore, an LE presence on Pea Island was anticipated. Unfortunately, her resignation left a void in the area of LE again. RB Donaghue-Stanton is currently the only staff assigned to Pea Island, and she does not hold an LE commission. There is still an obvious need for more LE presence on the refuge. Maybe this need can be met during 1995.

The most common LE problems are car clouting, illegal parking, vandalism to NPS restrooms, public nudity, littering, and dogs off a leash.

Pea Island's beach is a desolate place and has had drugs wash in from vessels whose cargo has been dumped at sea. In these cases, there are usually people on shore searching for the drugs, as well as Coast Guard and other officials.

There are minor poaching problems at Pea Island; occasionally cars will stop and shots will be fired at waterfowl from the road. Poachers sometimes slip in from Pamlico Sound to quickly shoot as many waterfowl as they can and then speed away. Some illegal hunting may take place within the refuge boundaries in the Pamlico Sound. These types of violations are difficult to detect and the violators are difficult to apprehend. On the whole, however, there are no major LE problems on Pea Island.

The following NOV's were written by FWS and NPS officers on Pea Island during 1994:

<u>Quantity</u>	<u>Offense</u>
1	Trespass- Closed Area
1	Rape
1	Indecent Exposure
3	Camping
1	Suicide Attempt
1	Vehicular Trespass
1	Speeding
13	Unsafe Operation (Vehicle)
1	Vandalism (Vehicle)
2	Vandalism to Government Property
1	Drug Possession
1	Vehicular Larceny/Felony Breaking and
6	Entering

18. Cooperating Associations

Though the Coastal Wildlife Refuge Society is officially reported in the Alligator River ANR, a great deal of it's activity relates to Pea Island.

The sales unit at the VCS continued it's activity during 1994. Through July, sales were average. Of course, after the Visitor Center opened in July, sales soared! It is expected that the summer and fall of 1995 will set a record for income for the CWRs.

The bulk of CWRs activity (income and expenditures) to this point have been associated with Pea Island. 1995 should see the finalization of most of the public use related facilities at Pea Island. At that point, the focus will move toward Roanoke Island!

For full details of CWRs activities for the year, see Section H.18. of the AR ANR.

I. EQUIPMENT AND FACILITIES

1. New Construction

The refuge authorized NCDOT to construct approximately 10 acres of wetlands on the south end of Pea Island. This project was for mitigation of impacts to wetlands from several DOT projects in this part of the state. The site utilized was upland shrub/grassland communities with no wetland values immediately adjacent to a 5 acre mitigation constructed by DOT in 1990 for project actions on the refuge. All excavated material was placed on refuge impoundment dikes - all 40,000 cu.yds.- and was sufficient to repair the severe storm damage that occurred to these dikes from storms in October of 1993. DOT's contractor completed all the surveying, hauling of material, and grading in the repair of the dikes.

A new water well was drilled at the headquarters site during the year. The casing failed on the old well during mid-summer forcing several summer interns and volunteers to go without onsite water for about 3 weeks.

With funding from NFWF, CWRs, Watchable Wildlife, and Challenge Grant, a Visitor Center was construction at the head of North Pond Trail.

2. Rehabilitation

The 4 buildings at Pea Island headquarters were reroofed during 1994 - repair of hurricane storm damage. The \$28,570 job was completed in 3 weeks by Powerhouse Construction.

Approximately 1.5 miles of dikes were reseeded to a mixture of drought tolerant grasses in April. Efforts to reseed these dikes in August, 1993 by hydromulching was totally unsuccessful.

3. Major Maintenance

Both the USCOE and NCDOT were required to "till" the beach segments they had nourished during 1993. Compaction readings (psi) of these segments had increased from 300 - 400 psi to 600 - 700 psi following disposal activities. Tilling was accomplished with a crawler tractor using a ripper capable of penetrating at least 36" deep. This effort was successful in that compaction levels reduced substantially (to about 300 - 400 psi) and thus eliminated one possible impact to turtle nesting.